

JANUARY 1956

chemical processing

For Men who Manage

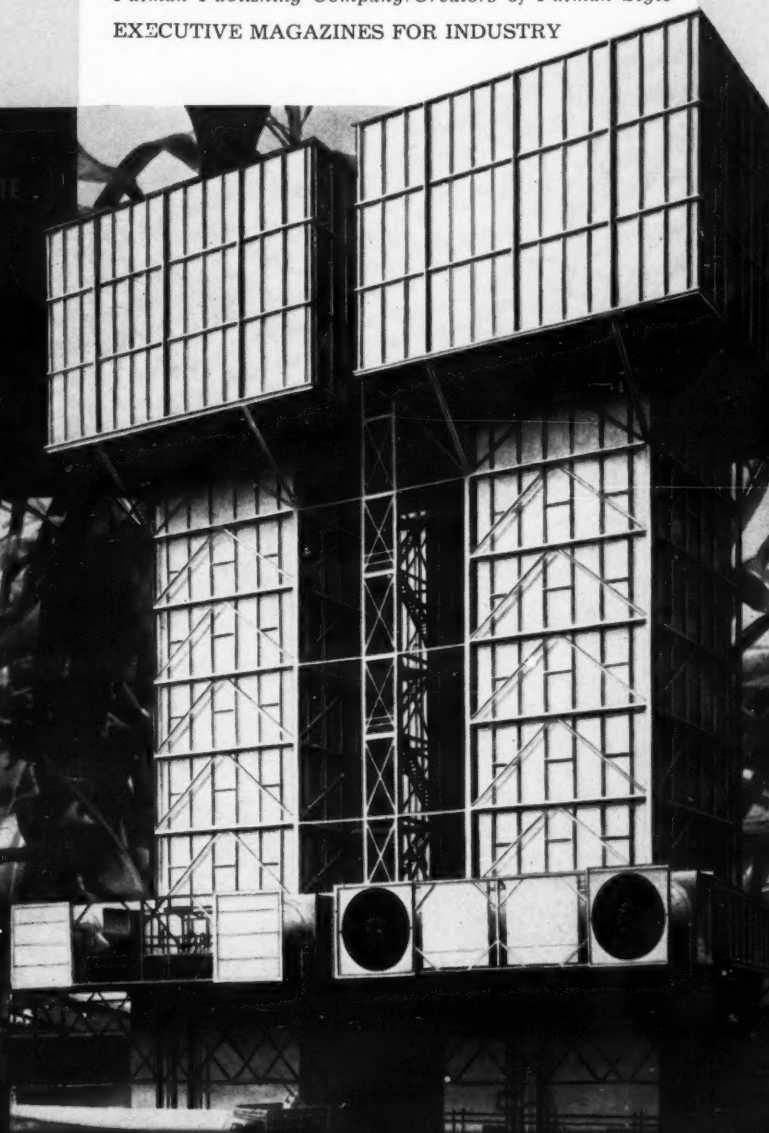
- Cycle control gives automatic 24-hr test column runs 12
- Reinforcing extends range of Teflon 86
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Putman Publishing Company/Creators of Putman-Style
EXECUTIVE MAGAZINES FOR INDUSTRY

SPENCER'S AMMONIUM NITRATE PRILLING TOWERS

keys to more and better crops
... through fertilization

Switch in prill-bagging method
saves \$250 a day ... see page 10



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"Notice an increase in editorial content?"

Paper now going to the cows

Patent on a process for preparing feedstuffs for ruminant animals which contains substantial amounts of waste newsprint goes to Dr. Jonas Kamlet of Kamlet Laboratories in New York City. Dr. Kamlet says there is no objection to some kraft paper in the recipe to give roughage, if not added flavor. He suggests mixing in a bit of molasses to improve the taste.

The patent states that all cellulose in newsprint is highly digestible and can be used as a substitute for dry cattle roughages and ensilage. There has been no comment for the cows or goats.

Chemicals at Disneyland

The marvels of chemistry are being revealed to thousands at Southern California's new Disneyland. Monsanto Chemical Co., sole exhibitor among chemical firms, is presenting mobile and stationary exhibits featuring basic chemicals, chemical manufacture, chemical uses... plus samples of more than 500 chemicals and plastics Monsanto makes. The exhibit is, of course, in *Tomorrowland*.

Chemicals advance comfort of air travel

All aircraft of Swissair, the airline of Switzerland, are now equipped with a device which eliminates tobacco and cooking odors and prevents air-sickness and nausea.

The heart of the device — a non-toxic, non-irritating hydrocarbon called P-6 — is so effective that cigar-smoking aloft will be encouraged.

11 Steps to a poison

Chemists at University of Wisconsin have succeeded in synthesizing an extremely poisonous alkaloid called cytosine. The unique unsymmetrical, bridged structural system of the compound represents a chemical hurdle in the synthesis of similar more useful alkaloids. Cytosine itself is so poisonous that it is of little practical value. Starting material in the synthesis was a simple coal tar product known as alpha-picoline. Forming cytosine required 11 steps.

(Please turn to page 187)

chemical processing

(CHEMICAL PROCESSING PREVIEW)

for men who manage

Vol. 19

January, 1956

No. 1

Serving more than 45,000 circulation in these industries:

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W-8

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Food for thought . . .

Many times in the past we've talked to you about the "case history" stories that appear in the New Solution section (it begins on page 10 in this issue) of our magazine. These are the ones that involve plant know-how and tell how problems were solved in plants.

Although these articles deal with a specific problem in a specific field, the principles and techniques involved in solving the problem could conceivably be applied to different fields in nearly all cases. Take for example the story appearing on page 16. It describes how a utility plant stopped cooling tower damage and eliminated slime formation in condensers by automatically controlling the pH of the water passing through the equipment. Obviously, control of pH is not limited to water and neither is the use of cooling towers and condensers restricted to utility companies.

Another example is the article on page 15. The story explains how Lindsay Chemical Company protects its personnel and equipment by using plastic duct to remove corrosive and obnoxious fumes from its rare earth and thorium processing plant. Certainly the problem of getting rid of fumes is not limited to this particular industry. The duct could solve a similar problem in practically any field.

The same, of course, holds true for the other stories in the section — whether they involve dust collection, material handling, instrumentation, processing, etc. The basic fundamentals of chemical engineering unit operations are always the same, regardless of where they are used. You can never tell . . . the "other fellow" may have solved your problem for you.

Ted F. McElroy

ASSISTANT EDITOR

• For more information on articles and advertisements in this issue, check the Reader Service slip opp. last page

• The product directory, pages 178 to 181, is your guide to all articles and advertisements

• To subscribe to this magazine, see reader-qualification form opp. last page

CHEMICAL PROCESSING • January, 1956 • volume 19 number 1

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THIS MONTH'S COVER

Spencer Chemical's ammonium nitrate prilling towers at Pittsburg, Kansas, symbolize the increased productivity that has been given to our soil by fertilizer plants across the nation. Story on how company saves \$250 a day in bag costs for dry material starts on page 10; story on how fertilizer formulation costs were cut through the use of liquid ammonium nitrate begins on page 30; and story on how prilling towers produce uniform pellets is on page 55.



Jan 18-20. Society of Plastics Engineers, 12th Annual Conference, Hotel Statler, Cleveland.

Jan 23-26. Plant Maintenance & Engineering Show, Convention Hall, Philadelphia.

Jan 23-27. American Standards Association, Gaillard Seminar on Industrial Standardization, New York City.

Jan 24. National Association of Purchasing Agents, Chemical and Allied Products Buyers' Group, Mid-Western Meeting, Palmer House, Chicago.

Jan 31. NAPA, Chemical and Allied Products Buyers' Group, Eastern Meeting, Hotel Commodore, New York City.

Feb 1-2. Chemical Market Research Association, Meeting on Aromatic Chemicals, Pittsburgh.

Feb 7-9. The Society of the Plastics Industry, Inc., Eleventh Annual Reinforced Plastics Division Conference, Hotel Chalfonte-Haddon Hall, Atlantic City.

Feb 26-29. American Institute of Chemical Engineers, Statler Hotel, Los Angeles.

Mar 8-9. American Institute of Electrical Engineers, Conference on Electrical Engineering as applied to the Pulp and Paper Industry, University of Florida, Gainesville.

Apr 9-12. American Management Association, 25th National Packaging Exposition, Convention Hall, Atlantic City.

Apr 10-12. Metal Powder Association, 12th Annual Meeting and Metal Powder Show, Hotel Cleveland, Cleveland.

Apr 18-20. Armour Research Foundation of Illinois Institute of Technology, Industrial Research Conference on "Research for Profit", Illinois Tech Campus, Chicago.

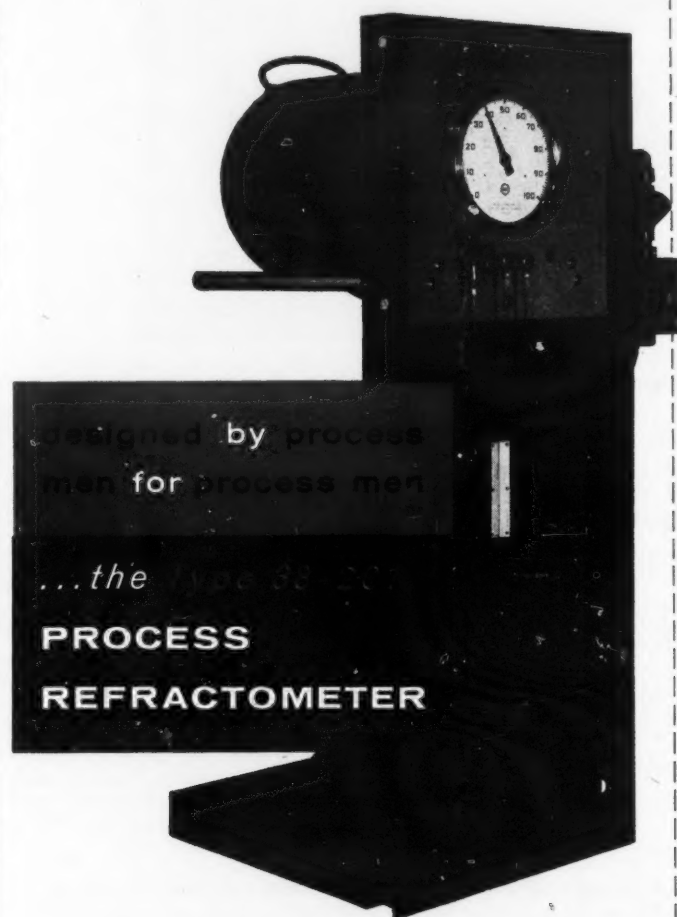
Apr 23-28. Chemical Progress Week, sponsored by the Manufacturing Chemists' Association.

Apr 26-27. American Institute of Electrical Engineers, National Meeting, Bradford Hotel, Boston.

Apr 29-May 3. The Electrochemical Society, Inc., Mark Hopkins Hotel, San Francisco.

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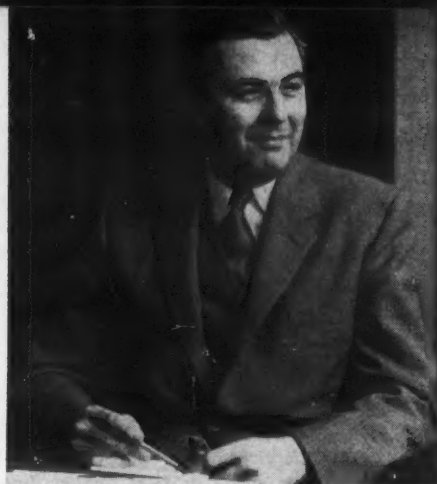


38-301
Oxygen
Analyzer



38-401
Ultraviolet
Analyzer

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DR. EDGAR L. PIRET

AICHE's Walker Award bestowed on Dr. Edgar L. Piret



Among his other honors, Dr. Piret holds (from left) the MEDAILLE of the University of Liege in Belgium, the Friedel Medal of the University of Paris and, his latest, the William H. Walker Award



AT the annual conclave of the American Institute of Chemical Engineers in Detroit in November ('55), Dr. Edgar L. Piret was given the 1955 William H. Walker Award. Named for a pioneer chemical engineer, this award recognizes exceptional contributions to technical literature. Though the list of publications by Dr. Piret bounds a wide field of interest, this award specifically cites his publications in chemical reactor design and size reduction study.

In addition to the Walker Award, Dr. Piret holds the *Palmes Academiques* of France, the Friedel Medal of the University of Paris, the *Medaille* of the University of Liege in Belgium, the Bronze Medal of the Swedish Association of Engineers. He is an officer of the *Academie* of the Republic of France.

This preponderance of European recognition is striking since Dr. Piret was born in Winnipeg and began his education in the United States. He received a bachelor's degree in chemical engineering from the University of Minnesota in 1932. In 1936 he

Dr. Piret long a member of Chemical Processing's editorial advisory board



CHEMICAL PROCESSING'S Editorial Advisory Board in session. From left: J. H. Folwell, L. M. Sherman, J. B. Calkin, R. S. McDaniel, John C. Vaaler (Editor), W. H. Williams, E. F. Wagner, W. C. Rousseau, E. L. Piret, and C. M. Cooper

DR. PIRET'S vast experience in technical literature is displayed in his work with the Editorial Advisory Board of CHEMICAL PROCESSING magazine. He is one of ten current members who regularly meet to guide and criticize the editorial content of the magazine. These men also visualize and shape goals for CHEMICAL PROCESSING's editorial staff.

Representing diversified interests and responsibilities in a variety of chemical processing operations, the members of the board make a unique contribution to editorial thinking. While their judgments are tempered by editors' experience, their opinions represent a sort of "essence of desirability" in CHEMICAL PROCESSING's editorial work.

These men work closely with the editors in looking ahead to what will be making news next year. They are thus able to emphasize the new developments in time to build up the background that leads to better evaluations, *specific* reports and *practical* information to define theoretical applications.

Features like the "Pioneers of Progress" articles have their beginnings in these meetings. Ideas for additional fields of news coverage are thrashed out. In studying proposed changes the board holds interest and value to readers the most important single factor.

The meetings are the "headquarters" from which

the long-range editorial goals are set . . . they are the force which gives vitality to day-to-day editorial work . . . and frequently they are the single factor that crystallizes a story concept . . . except, of course, for news-gathering, writing, art preparation, and printing.

Dr. Piret has been a member of CHEMICAL PROCESSING's Editorial Board since 1953. In a very real sense he has contributed to far more than the forty pieces of technical literature which bear his name. He and the other members of the Editorial Advisory Board, current and past, have made their judgment, knowledge, and experience felt in hundreds of articles published in these pages.

received his doctor's degree from the University of Lyon (France) in biochemistry. Following this, he returned to the University of Minnesota and, in 1937, acquired a second PhD in chemical engineering.

While he is still very active in education as a professor at the University of Minnesota, Dr. Piret is, in addition, a consultant to the engineering department of Minnesota Mining and Manufacturing Co. He is also consultant to the Naval Research Laboratory.

His contribution to chemical engineering literature has been very great indeed. More than forty papers and patents stem from his work. These range from continuous chemical reactor theory and design through leaching, heat transfer, fermentation, high-vacuum transfer operations, engineering education, and size reduction. Many of his papers have been published in French, German, and Finnish.

In addition to these fields of interest he is currently directing a project on chemical utilization of peat. This is sponsored by the Iron Range Resources and Rehabilitation Commission.

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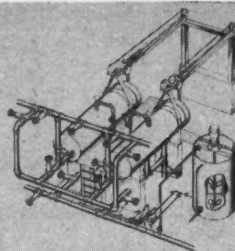
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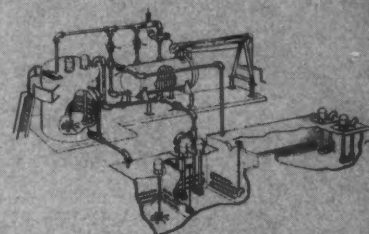
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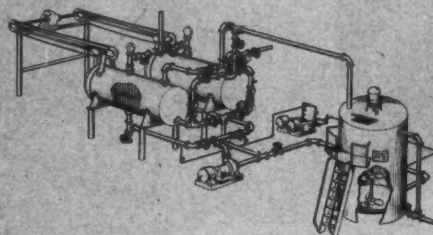
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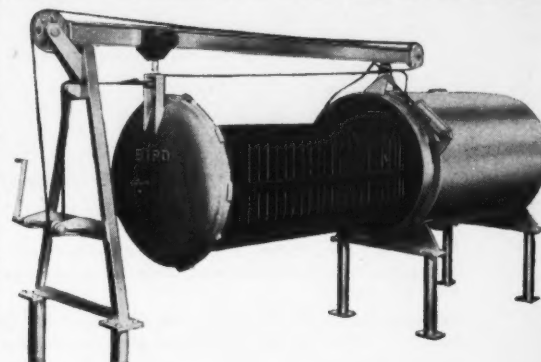
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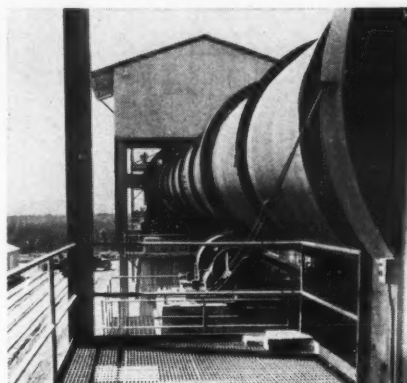
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*what you can expect in
next month's issue...*



Extracting lithium at Bessemer City

The huge Bessemer City, North Carolina, plant of Lithium Corporation of America produces lithium carbonate and hydroxide direct from low-grade spodumene ore, bypassing conventional concentration techniques. It goes without saying that handling and processing equipment for the plant has to be giant-size (for example, the decrepitation kiln, shown here, is 250 feet long and 11½ feet in diameter). Plant cost close to \$7 million, has been operating about a year on run-of-the-mine ore which analyzes 1.0% lithium.

Assistant Editor Ted Meinhold took a first-hand look at the plant recently, came away with a photo-feature story about how everything meshes together to assure continuous production. Credit R. L. Nielsen, Plant Manager at Bessemer City, with a strong assist on this "New Solutions" highlight.

CO₂-rich MEA a corrosion problem no longer

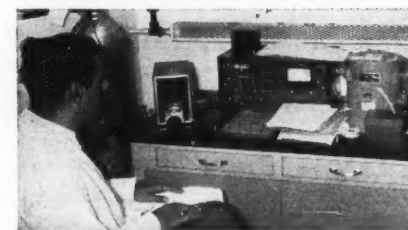
Carbon-dioxide-rich monoethanolamine solutions were corroding-out heat exchanger tubes in only a few months in an organic chemical plant. Switch to impervious graphite stopped the attack in its tracks. To top it off, same heat transfer is being ob-

tained with only 17% the surface area of previous exchanger... because of the high thermal conductivity of the graphite. Article is "Corrosion Control" feature next month.



Streamlined H₂SO₄ plant

When Associate Editor Gordon Weyermuller visited Davison Chemical's new sulfuric acid plant at Joplin, Mo., recently, he found that the plant takes advantage of a number of new ideas—which not only make the plant highly efficient, but make it attractive as well. J. L. Cogbill, Plant Supervisor, told Gordon how spray sulfur feeding, evaporative cooling, other features are used in plant. Story is highlighted in "New Solutions" next month.



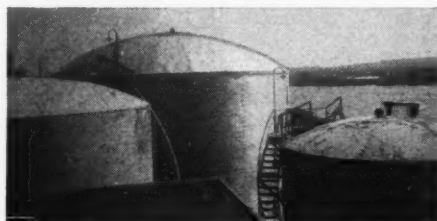
Tracer techniques aid reserpine development

The "Laboratory" feature next month reveals how radioactive tracer techniques speeded development of a process for extracting reserpine from *Rauwolfia serpentina*. The Squibb Institute for Medical Research put "nuclear sleuthing" to work when it found that use of bio-assay methods of analysis could add months, maybe years, to process development. (Problem in extracting reserpine is separating it from mixture of 22 alkaloids similar in structure and physical

Here's a quick preview
of features you'll find
in February's Chemical Processing

characteristics. Molecular structures and biochemical reactions have not been determined for many of these compounds). Practical process for separation of the active alkaloid from the mixture took only weeks to develop with tracer techniques.

Assistant Editor Bill Clarke visited the Squibb Institute this fall, quizzed Dr. Paul Numerof, Director of Radioisotopes Lab, and wrote the story about this big step in work on reserpine, an important material now being evaluated for treatment of cardiovascular and mental illnesses.



No moisture inside

Tanks shown here are three of a series that store a million gallons of solvents at Lehigh Warehouse and Transportation Company, Bayonne, N. J. Since many of these liquids are hygroscopic, moisture must be kept from them . . . 24 hours a day, seven days a week. Moisture can easily be picked up during pumping and storage. Percent moisture has to remain constant according to minimum specifications.

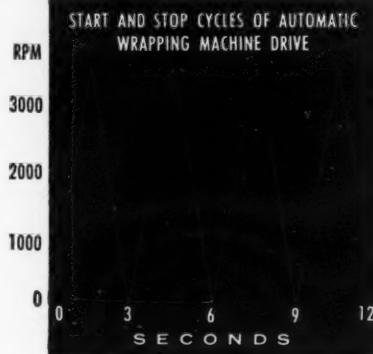
An "Engineering & Maintenance" feature next month tells how the job is done. Story was written by Assistant Editor Bill Clarke after he'd looked over the installation in the fall and talked things over with Philip De Feo, Warehouse Superintendent.

Isophthalic acid in enamels

Not long ago, Oronite Chemical Company opened its Isophthalic plant in Richmond, California. Big use for the material is in baking enamels for appliances, to which it lends hardness, water-resistance, and color retention. Oronite has developed three "backbone" formulations for such finishes. A February "Materials" feature brings them to you.



20 ROLLS OF
"SARAN WRAP"
EVERY MINUTE



The Dow Chemical Company's production of "Saran Wrap" has leaped from 130,000 rolls to 4,000,000 rolls a month since 1951. This up-swing is due to a new plant, a new flow system, and additional equipment including new machinery equipped with Reliance V*S Drives.

One of the most dramatic applications of V*S Drives is on the final wrapping machines shown here. The drives must be able to start, accelerate to 3500 rpm., and stop more than 20 times a minute.

The most important feature, though, is not the frequent starts and stops, but the delicately controlled acceleration of the drives. "Saran Wrap" is only 1/6th as thick as a human hair, and sharp or jerky starts will cause a break in the sheet and halt production. Reliance Drives do the job day in and day out without a single break due to uncontrolled acceleration.

This feature of V*S Drives, called *Dynamic Response*, is only one of the many facets of Reliance Drives. V*S Drives can regulate tension, synchronize operations, control speed rates, and automatically program speed changes.

Whether you handle a thin film of plastic or steel billets, on a complete production line or a single machine, Reliance can give you better quality, more production, and lower costs through Variable Speed Drives.

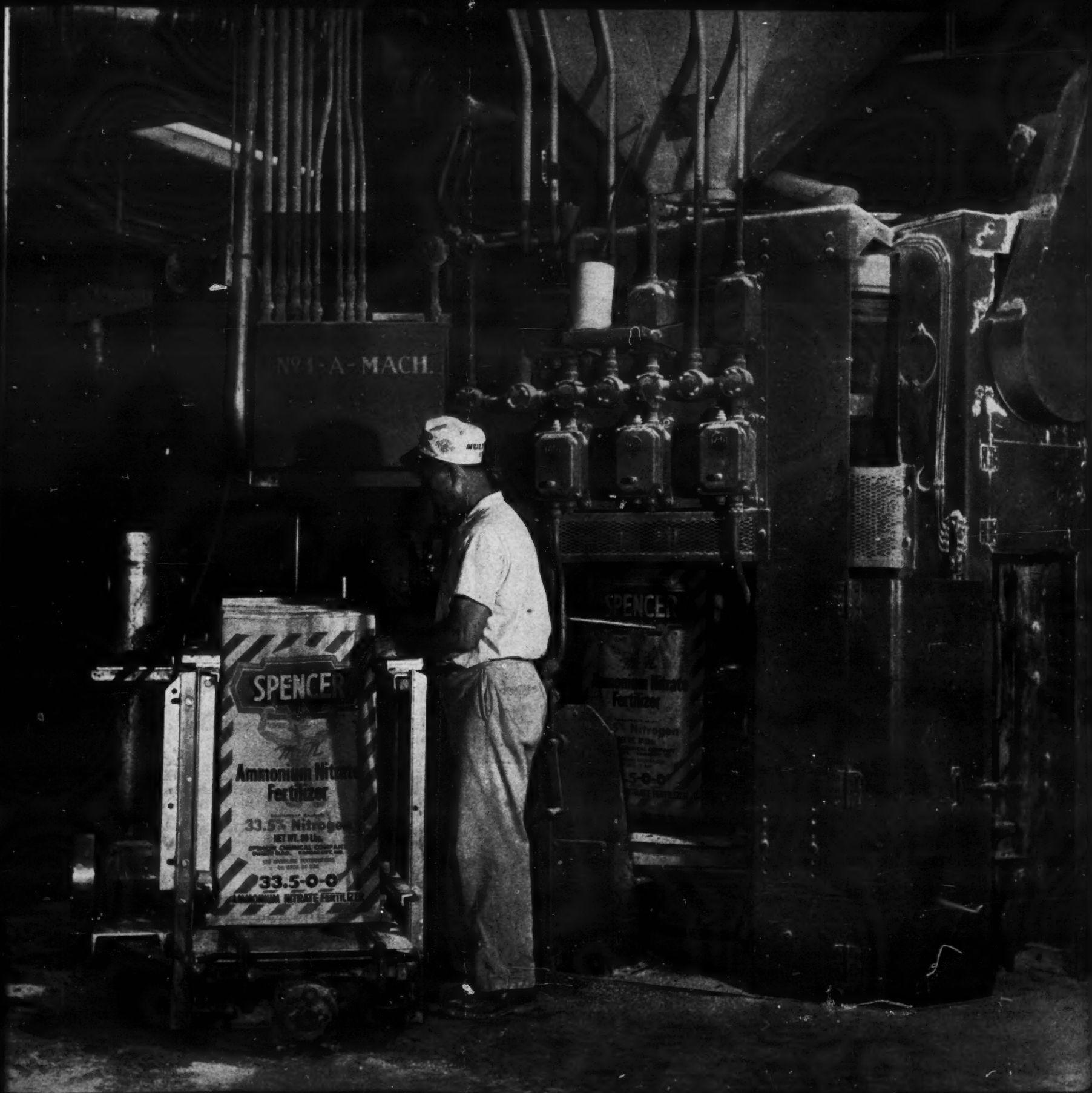
D-1504

Write for bulletin D-2311.

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Canadian Division: Welland, Ontario

When inquiring check CP 2916 opposite last page



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Ammonium Nitrate
Fertilizer

33.5% Nitrogen

NET WT. 50 Lb.

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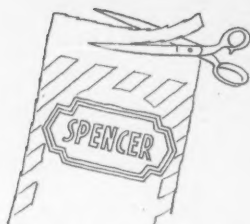
ON BRIDGE ST. S.E.

33.5-0-0

AMMONIUM NITRATE FERTILIZER

**new solutions
of processing problems**

By permitting one-inch shorter polyethylene-lined bags to be used, automatic bagging unit —



**saves \$250 per day
in bag costs**

Automatic bagging operation also cuts crew from eight to three men per shift, releasing men for other assignments in plant, while improving accuracy and quality of package

By **GORDON WEYERMULLER**, Associate Editor
With **P. W. GIDDINGS**, Superintendent
of Nitrate Prilling Plant
Spencer Chemical Co., Jayhawk Works,
Pittsburg, Kansas

Problem: Although bagging operation at the Jayhawk Works of Spencer Chemical Company was considered to be an excellent example of manual bagging and was shown to many interested parties, it did have certain inherent disadvantages. Prilled ammonium nitrate was weighed manually, filled manually, and bags sewn on a bag packer.

Some free space at the top of polyethylene bag was required in order to sew properly, adding to bag costs. Some human element entered into the weighing although every eighth bag was checkweighed. Manual operation required eight men per shift. Each bag had to be manually opened and placed on spout. Work was hard and somewhat tedious.

Solution: In September 1952 an automatic Model A Bagpaker was placed in operation. Packer is designed around an eight-station rotary

turret, each section of the turret having independent bag spouts, bag-gripping assemblies, and bag-top-forming mechanisms. Packer can handle the complete range of bag sizes from 15 to 22" in width. After automatically weighing, introducing product, and thoroughly settling the contents, machine prepares top of filled package, and closes with a stitched and taped closure.

Three plate scales are used to preweigh the material and another to checkweigh each bag after it has been filled and closed. Advantage of these scales is that they maintain their high accuracy since they operate by the plate frictionless leverage system and have no knife edges to wear and change weight.

One outstanding feature of the packaging operation is the bag opener, upon which a patent is pending, that was invented and made by Spencer Chemical Company. This unit, which serves as storage for 500 unfilled bags, automatically separates one bag from the others, opens it, and then holds it in position for operator to place on machine. Bag opener does not operate on a time sequence but holds bag in front of operator until he takes it, then immediately opens and positions another bag for him.

Results: One important advantage obtained from use of the automatic packer is that machine places either 80 or 100 lb of material in a bag one inch shorter than can be used with hand packing.

This means a saving of about 25c per ton of material packaged in bag costs or about \$250 per day at average plant production rate of 1000 tons per day.

High rates are satisfactorily handled by the packaging setup. Automatic packer may be operated at rates of up to 22 bags per minute.

Automatic packaging setup has permitted crew to be reduced from eight down to three operators per shift, the men being released for other assignments in the plant. Bag opener releases one of these men per shift for other duties. Previous to its use it was found that one man could only take 12 to 14 bags per minute from a pile and place them under packer. It was necessary to use another man to open the top of each bag and hand it to him in order to operate at the higher rates of up to 22 bags per minute. With bag opener,

(Please turn to page 18)

For story on how Spencer Chemical's nitrogen solution saves fertilizer formulation costs at Arkmo Plant Food Company, see page 30.

For a story on how Spencer's prilling towers produce uniform pellets of ammonium nitrate which distribute evenly, see page 55.



After being filled, each bag is checkweighed in line (left) and then goes up conveyor (front)

CP Staff Photo

Operator checks bag opener used with automatic packer seen at right
CP Staff Photo



**new solutions
of processing problems**

**Fast customer service allowed
limited time for solving ion
exchange problems. Installing
automatic cycle control gave . . .**

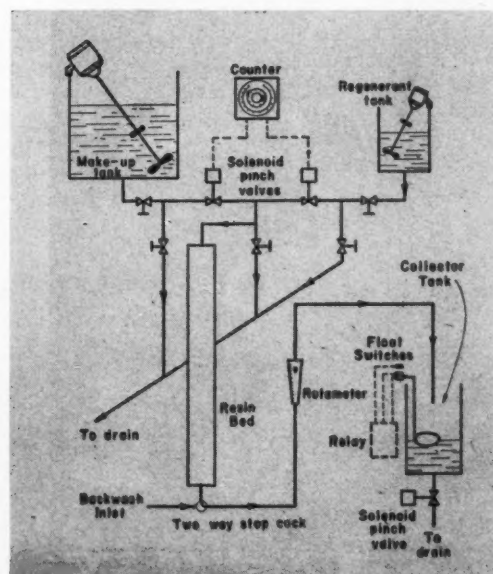
24-hour runs on test columns

with only eight hours of supervision

by **WILLIAM C. CLARKE**, Assistant Editor

Data verified by **A. FRADKIN**
Ion Exchange Division
National Aluminate Corporation
Chicago, Illinois

◀ Analytical section of Nalco Laboratories helps
determine reasons for scale formation and corro-
sive attack by waters



Simplified flow diagram of ion exchange unit

PROBLEM: Manual operation of ion exchange test columns in the laboratory of National Aluminate Corporation of Chicago, Ill., was often too slow for customer service requirements. Constant supervision of columns was also required by test engineer. Better customer service required faster answers to ion exchange problems.

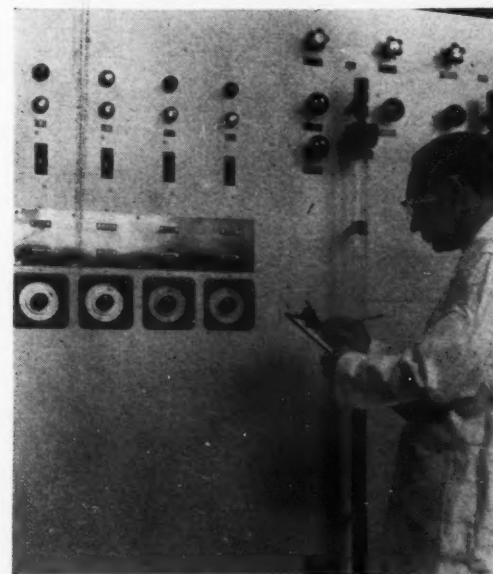
Nalco is constantly searching for new solutions to problems of ion exchange. Studies are made on chrome rinse solutions, for example, from chrome plating or anodizing systems to determine capacity and life of ion exchange resins. Physical stability of a cation resin may be determined on a water softening cycle, or studies on demineralizing water for special process applications may be undertaken.

Solution: Equipment for measuring amounts of test solutions put through exchange columns was developed and installed in laboratory. Microflex reset counter made by Eagle Signal Company is used as control element. Test unit has two-stage (exhaustion-regeneration) cycle, which can be adjusted in length for different cycle requirements.

Unit of control is called a "dump" and is adjusted to equal regenerant volume. Electrical reset counter shows how many times effluent collector tank is emptied or "dumped"—and automatically shuts off supply of test solution to unit at end of one operating cycle. Counter again acts as control unit by sending regenerant through exchanger bed. Following regeneration another operating cycle is automatically begun.

All working parts of test unit are plastic or stainless steel to reduce contamination and corrosion.

(Please turn to next page)



Operator notes number of "dumps" run through each column

CP Staff Photo

AUTOMATIC CYCLE CONTROL

(Continued from preceding page)

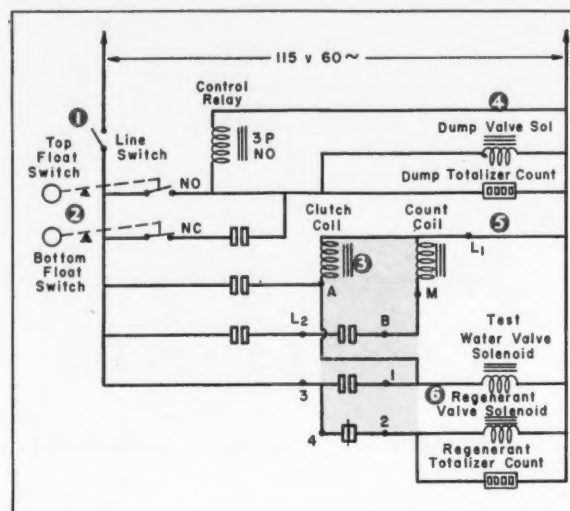
Saran-lined valves and pipe are used. Hills-McCanna rubber-Saran valves and Tygon tubing (with electrically-controlled pinch valves) are also used. Four columns may be operated independently, in series, or together as a single unit. Each column has its own make-up and regenerant tanks, separate operational controls.

Here's how test unit works — demineralized water for preparing test solutions is piped into plastic-lined make-up tank. Test solution is made up by adding desired reagents, and then passed through one or more of four clear-acrylic resin columns. Treated solution is collected and periodically dumped by solenoid-operated valve. Dump valve is actuated by float in effluent collecting tank.

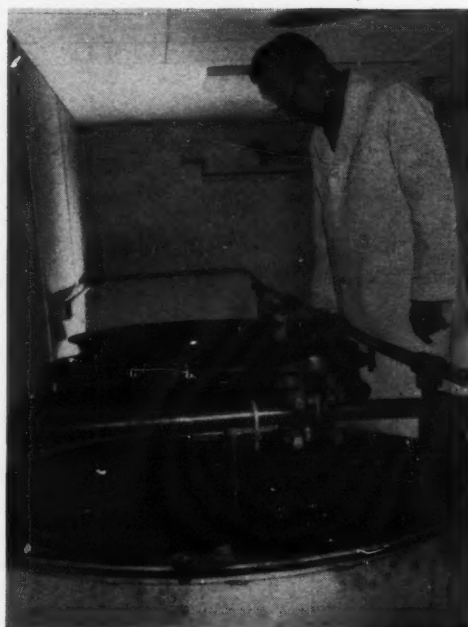
Results: Once the test run has been set up, unit will run continuously over periods of several days without any supervision. Volume control has become more precise. Test results are reproducible within $\pm 1\%$. Best of all, customer service is fast and answers are found within required time limits.

(Microflex reset counter is a product of Eagle Signal Corp., Dept. CP, 202 20th St., Moline, Illinois. Check CP 2917 opposite last page.)

circuit works by



- 1 ... throwing line switch to energize regenerant valve solenoid which allows regenerant to pass through column into collector tank.
- 2 Top float switch closes when collector tank is full and operates control relay. Bottom float switch "locks" control relay through dump valve solenoid. Collector tank is dumped.
- 3 Clutch coil is energized through contacts of control relay. Normally closed contacts between 4 and 2 are opened to de-energize regenerant circuit. Test water valve solenoid is also energized through contacts 1 and 3.
- 4 After collector tank has been dumped, bottom float switch opens to remove control relay from circuit and de-energize dump valve solenoid. One count is registered on counter.
- 5 Collector tank now fills with test solution until top float switch closes and cycle is repeated. Tank is repeatedly filled with test solution until counter counts out and resets. Contacts L2-B and 3-1 then open and 4-2 closes.
- 6 Regenerant valve solenoid is then energized to repeat complete operational cycle.



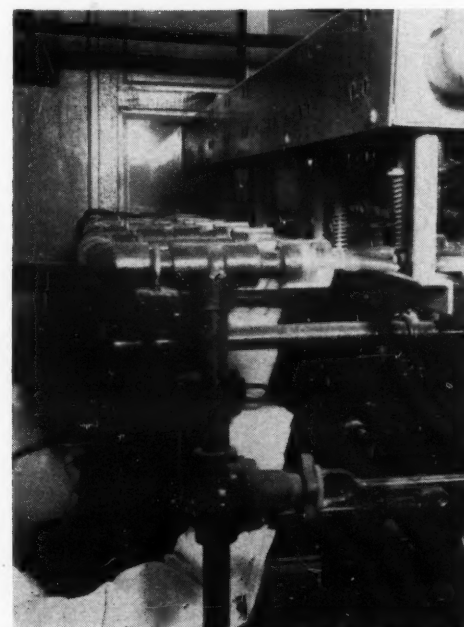
CP Staff Photo

Make-up tanks are checked before beginning a test run



CP Staff Photo

Each column is controlled by a float. Operator indicates float assembly for one column



CP Staff Photo

Solenoid pinch valves control flow of test solutions and regenerant

Lindsay Chemical Company "plays it safe"
— protects personnel and equipment with
plastic duct system that . . .

removes corrosive, obnoxious fumes

***Rigid, lightweight reinforced plastic pipe
is easy to install, withstands temperatures
to 275°F in intermittent service***

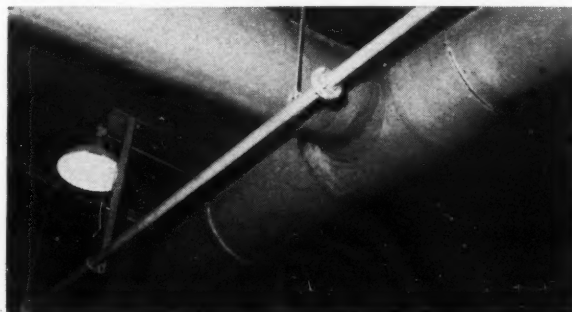
By **TED F. MEINHOLD**, Assistant Editor

PROBLEM: An effective method of removing corrosive and obnoxious fumes was sought by Lindsay Chemical Company, West Chicago, Illinois, for their new \$2.5 million four-story addition. Large quantities of SO_2 , SO_3 , H_2S , and other troublesome fumes are given off in the various reactions carried on in the plant. Company is largest producer of rare earth and thorium chemicals in the US.

Solution: Engineers decided on glass-reinforced polyester ducts to remove the exhaust fumes. Ducts from individual mixers and tanks are connected to a common header on each floor. Headers in turn lead into main exhaust stack located on outside of building. Total inside ductwork measures about 300 ft long and consists mostly of 12" and 30" diameter sections. A 15,000 cfm rubber-covered exhaust fan, mounted on roof, provides necessary suction for the system. Outside stack has 44" diameter and is 69' long (including 90° elbow, cross run to fan chamber and riser beyond fan). For faster installation, stack was prefabricated with flanges.

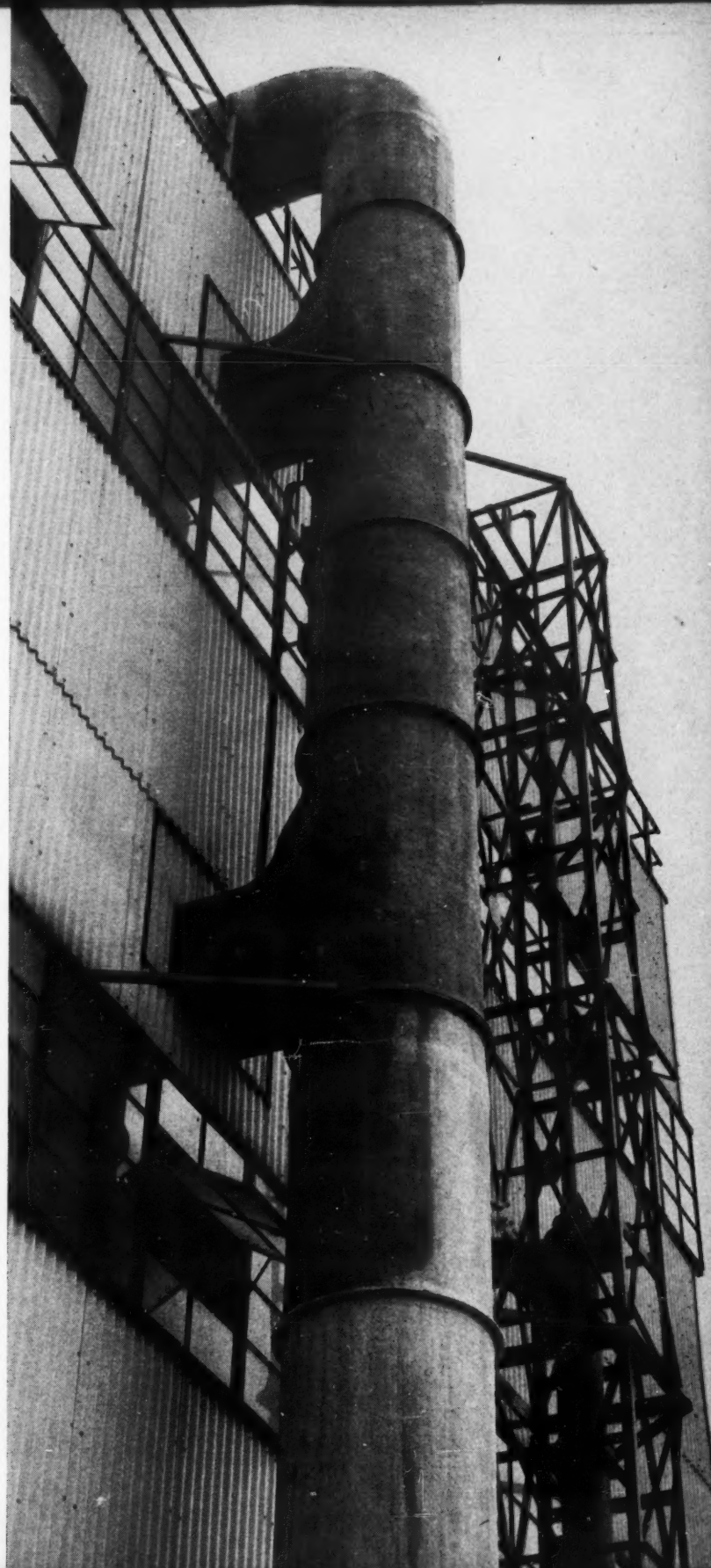
Manufactured from resin-bonded glass fiber laminate, ducts are rigid, lightweight, and easy to install. Individual sections can be wrap-welded together with handy kit supplied with

(Please turn to page 19)



◀ Ducts from individual units inside plant, lead to common header on each floor. Total ductwork in plant measures over 300 ft

▶ Headers from each floor lead into main 44" diam stack on outside of building. For quick installation, stack was prefabricated with flanges





controlled pH halts fouling, corrosion

Electric power station solved a nasty water conditioning problem with automatic addition of sulfuric acid

by **BRUCE FADER**, Associate Editor
with **EARL S. KENNEDY**, Chemical Engineer
Kansas Gas & Electric Company

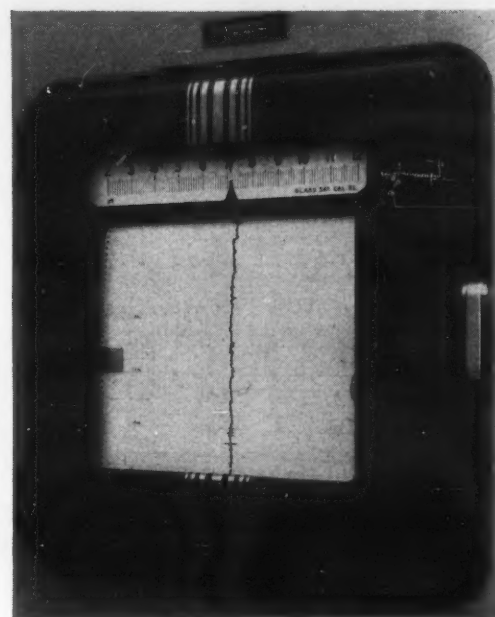
Problem: In 1950, report of an inspection team alerted the Ripley Station of Kansas Gas & Electric to possible trouble. Slight fungus attack of wooden cooling towers had been noted. Among the recommendations of this team was a suggestion that pH of recirculating water be lowered from 8.0-8.3 to 6.5-7.5. This is the natural pH of the redwood of which towers are built. While better for life of redwood, however, this lower pH could have put metal equipment in jeopardy.

Before anything was done about lowering pH, a second situation added urgency to the problem. Heat transfer figures started downwards and inspection disclosed spongy, voluminous slime on the water side of condensers. Manual cleaning and heavy chlorination checked but did not clear up this fouling.

Trouble was spotted as an influx of biological manganese in local water table. Chlorination produced granular deposits of manganese dioxide at the chlorine orifice, tightly plugging it. One condenser had to be acid washed. It was imperative that pH be lowered to the 7.0-7.5 region and heavy doses of polyphosphate be added to sequester manganese and to inhibit corrosion of metal.

Solution: Acid addition system installed used a 12,000-gallon normalized steel tank for storage of 66° Be° sulfuric. Acid is siphoned from this tank to a five-gallon suction tank just above acid pumps; siphoning being started by a jet pump which can be valved off.

Proportioning pumps move acid through stainless pipe to the tower. Pipe is run up side of tower and terminates in a loop with an inverted goose-



Trace on strip chart shows how accurately pH is held

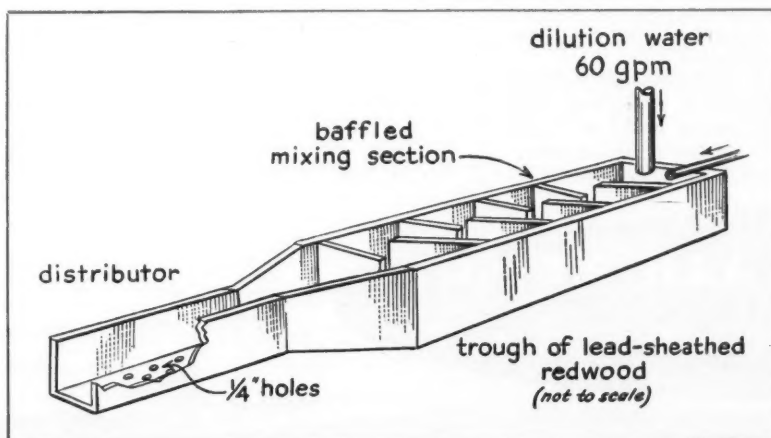
neck tapped in at its highest point. This assures enough head (back pressure) to produce good seating of the ball seals of the proportioning pump, yet prevents siphoning through the pump.

Inside the tower a lead pipe descender carries acid to one end of an open distribution trough. Visual inspection here is one advantage of this scheme. Water (at 40 to 60 gpm) is discharged into trough at the same point. This is in addition to water which is raining down from the tower fill. Made of lead sheathed redwood, this trough is slightly pitched toward a perforated section from which diluted acid drips into tower's basin. Eleven lead baffles along trough's length guarantee thorough mixing.

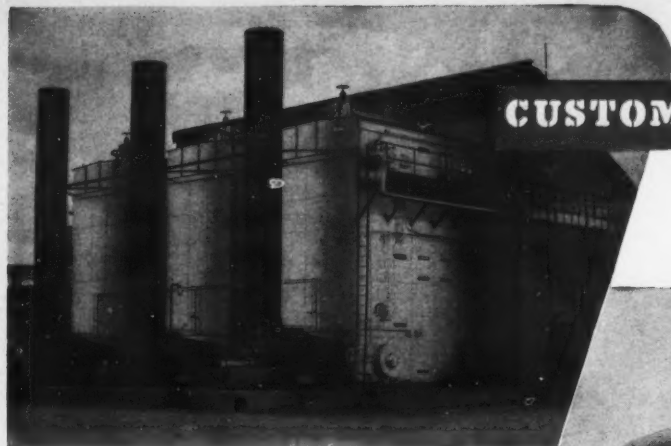
Control action is taken by altering pump stroke. This is done with a roundchart recorder and controller. pH is taken with glass electrode, reference electrode, and temperature-compensating probe in plastic cell.

To insure safety of operation, safety switch shuts acid pump off whenever pH drops to a predetermined level. This protects metal from corrosion. In addition, alarm contacts are set 0.4 pH units either side of pH setpoint. Operating practice calls for upsetting system once a day by changing pH setpoint so that operator can be sure system is working properly.

Results: This system has worked so successfully that it has been adopted at three stations. pH can
(Please turn to next page)

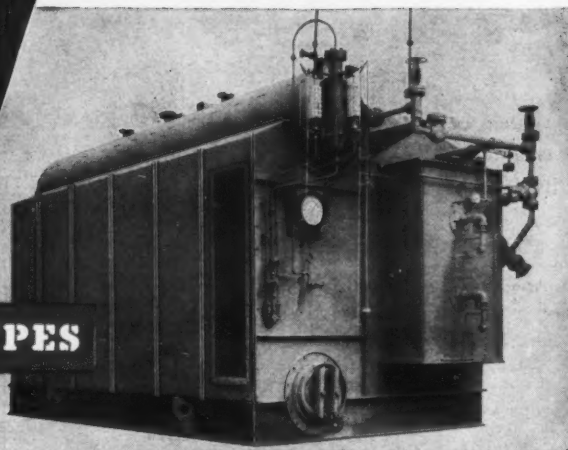


Looking down the trough (inside cooling tower), showing heavy rain of water being cooled. Acid is added through lead pipe (left foreground) and mixed as dilution water passes baffles



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PACKAGE UNIT TYPES



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Steam costs too high? Then it's high time to replace outmoded boilers with modern Voegt steam generators of the type and size to exactly fit in with specific operating conditions.

Voegt steam generators are designed to give maximum rating in minimum space, with high efficiency and low maintenance expense. They are available in bent tube types and straight tube, forged steel sectional header types for solid, liquid or gaseous fuels burned singly or in combination.

Package units range from 10,000 to 30,000 pounds capacity and custom built units are obtainable in the larger capacities. Many installations in successful operation are proof of Voegt's ability to give effective help in the solution of steam generating problems. *Bulletins may be had upon request. Address Dept. 24-BCP*



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When inquiring check CP 2918 opposite last page

NEW SOLUTIONS of processing problems

Controlled pH

(Continued from preceding page)

be held within 0.1 pH unit of the setpoint. No violent changes occur in normal operation — control is a throttling action.

Practically no trouble has cropped up with pH measuring equipment. Very little maintenance has been required. Recorder is checked daily against a lab meter and adjustment is made if necessary. pH cells are located in the laboratory in two of the stations. Here they are accessible for checking.

At Ripley station, where system was installed in January, 1954, mechanical cleaning has not been needed — deposits have disappeared. While there is still a black varnish-like coat of manganese on tubes, deposits elsewhere have been gradually disappearing and large deposits are gone.

(pH control equipment for Ripley Station was furnished by Leeds & Northrup Co., Dept. CP, 4901 Stenton Ave., Philadelphia 44, Pa. Check CP 2919 opposite last page.)

Cuts bag costs

(Continued from page 11)

this additional man is no longer needed.

Operators like the present packaging setup much better than the former one since the work is easier and much less tedious.

Scales used in packaging operation operate trouble free and assure a higher degree of accuracy. Weights run ± 2 oz on a 80 or 100 lb bag. Automatic packer provides a higher quality job in general, the taping being more uniform and the package neater. Product is protected by the polyethylene lining and sealed bag which keep moisture out.

(Model A Bagpaker is product of Bagpak Div., International Paper Co., Dept. CP, 220 E. 42nd St., New York 17, N. Y. . . . or for more information check CP 2920 opposite last page.)

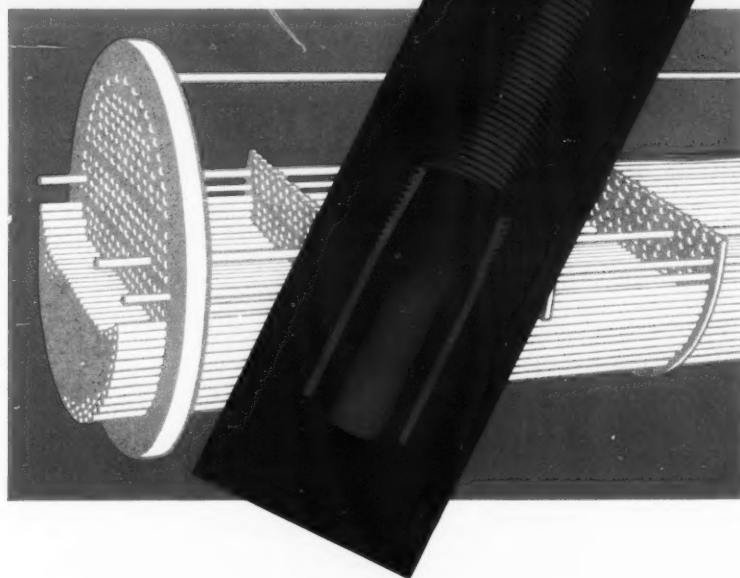
(Thayer-plate scales are manufactured by Thayer Scale & Engineering Corp., Dept. CP, 494 E. Water St., Rockland, Mass. . . . or for more information check CP 2920A opposite last page.)

This month's Processing and Engineering
Data section starts on page 164

HERE'S WHAT WOLVERINE TRUFIN* WILL DO FOR YOU...

TRUFIN*

- STEPS UP
HEAT TRANSFER
EFFICIENCY
- SAVES TIME
- SAVES MONEY
- SAVES
VALUABLE SPACE



Yes, if you want more heat transfer efficiency—want to save time, money and space—here's a tip for you. Investigate, today, the possibilities of Wolverine Trufin Type S/T condenser tube.

Type S/T is an extended surface condenser tube. Its extruded fins—providing greater heat transfer surface—are actually part of the tube wall. A $\frac{3}{4}$ inch Type S/T condenser tube, for example, has an external-to-internal surface ratio of $3\frac{1}{2}$ to 1. It has approximately $2\frac{1}{2}$ times the outside surface of the $\frac{3}{4}$ inch prime surface tube it is designed to replace. That means increased capacity—more BTU's from every foot of tube.

When an installation tubed with Trufin goes on stream—it stays on stream longer. Because the fins are part of the tube, they can't shake loose from vibration, thermal shock or pressure fluctuations. Actual operating data and pilot plant research indicate that Trufin Type S/T actually resists the

deposition of fouling materials. Maintenance costs go down—and stay down. When specified for new units, Trufin Type S/T permits the designing of smaller, more effective heat exchangers and condensers. You save space and you spend fewer dollars.

Type S/T—when specified as replacement tube—picks more heat transfer surface into existing units, steps up capacity far above original output. It can be directly substituted for prime surface tube without any deviation from standard retubing techniques.

And there—in brief—is what Wolverine Trufin Type S/T will do for you. Put it to the test—specify Type S/T—for both new units and when retubing existing units. Wolverine's new Processing Flow-sheets Catalog shows exactly where Type S/T is being used and can be used in the industry. Write for your copy—TODAY.

Wolverine Tube, 1469 Central Ave., Detroit 9, Mich.

*REG. U. S. PAT. OFF.

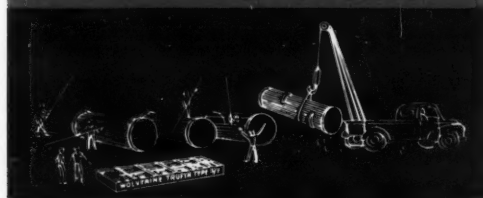
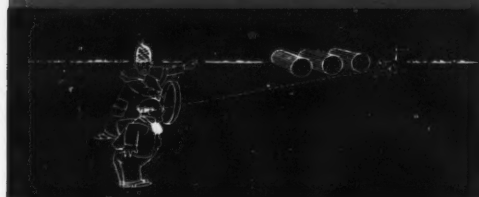
Wolverine Trufin available in
Canada through the Unifin Tube
Company, London, Ontario.



PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES

EXPORT DEPARTMENT, 12 EAST 47TH STREET, NEW YORK 17, NEW YORK

THE CASE OF THE KIDNAPPED CONDENSER



"See that vacant space out there—just to the right of those three condensers. It used to be occupied by No. 4 condenser—but not any more. Good old No. 4 is gone—kidnapped by a piece of licorice.

"What's that you say? It sounds like a mystery story with a trick ending. Well, in a way it is. It all started eight months ago when home office began screaming for more production. I'm telling you our whole engineering department sat up nights trying to figure it out. We just couldn't see how we could boost output—short of building a new plant, that is.

"Then we got our first real break. I'm sitting home one night—dead tired—when Johnny, my five-year old son walks in. Is he a mess. He's chewing on a piece of licorice—and it's smeared all over him.

"I start to take it away from him—when something about that licorice rings a bell in my mind. It's the way it looks—sort of like a piece of tube—with fins!

"Then it comes to me—something a Wolverine salesman had mentioned one day in my office. 'Wolverine Trufin*,' he said, 'is an extended surface condenser tube with integral helical fins squeezed right from the tube wall. Because of the fins, Trufin has much greater capacity than prime surface tube.'

"That was the clue we were looking for. We pulled a condenser and retubed with Trufin Type S/T. The results were terrific. Right away heat load jumped from 417,000 BTU's per hour to 829,000. You can just bet that No. 2 and No. 3 got the same Trufin treatment. No. 4 got the gate—we just don't need it anymore. You might say that it was kidnapped by Trufin Type S/T—and a piece of licorice."

Next time you retube—specify Wolverine Trufin Type S/T—see how it can solve heat exchange and condensing problems in your plant. Write, too, for the new Trufin Opportunity Book. It's filled with valuable design information and actual Trufin case histories.

Wolverine Tube, 1469 Central Avenue, Detroit 9, Michigan.

*REG. U. S. PAT. OFF.



PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES

EXPORT DEPARTMENT, 15 EAST 40TH STREET, NEW YORK 18, NEW YORK.

Plastic ducts

(Continued from page 15)

pipe. Material is not affected by extremes in weather and withstands temperatures up to 275°F in intermittent service.

Results: Plant is in full production and officials are pleased with the duct's performance. Ducts are unaffected by fumes and engineers believe that the material will last indefinitely.

(Pla-Tank ducts are product of Pla-Tank, Inc., division of The Chemical Corporation, Dept. CP, West Warren, Springfield, Mass. . . or for more information check CP 2921 on form which is located opposite last page.)

Solve rubber products handling problem with fiber containers . . .

sturdy, lightweight boxes resist chemical action of treated items

Problem: Plasticoid Company, Inc., Elkton, Md., had the problem of finding suitable containers to handle stamped sheets of rubber bottle tops, stoppers, and nipples coated with a sticky, erosive mixture of alcohol and glycerine. Corrugated shipping cartons were uneconomical in service, since the chemicals rendered them useless after a short period of time. Other containers were heavy to handle and lacked durability. Metal boxes were discarded because they marked-off.

Solution: Company purchased vulcanized fiber containers. Chemically inert, they are tough, resilient, and resist denting and cracking. They will not splinter, rust, or corrode. Being made from material that weighs only half as much as aluminum and one-third as much as steel, the containers are light in weight and easy to handle.

Results: Already in their ninth year of service, the receptacles have successfully withstood the chemicals with which the sheets are treated. Only indication of chemical action is slight amount of warpage.

(Kennett vulcanized fiber containers are product of Pennett Vulcanized Fibre Company, Dept. CP, 1000 Beech Street, Wilmington, Delaware . . . or for more information check CP 2922 on form opposite last page.)

For more information on product at left, specify CP 2923 . . . see information request blank opposite last page.



1,600,000 cubic feet per day . . . that's the combined capacity
of the more than 400 Sharples Super-D-Hydrators in operation . . .
continuous, automatic production of high purity crystals
at production rates up to 8 tons an hour.

The name Sharples is synonymous with efficient
crystal dehydration . . . write for Bulletin 1257.

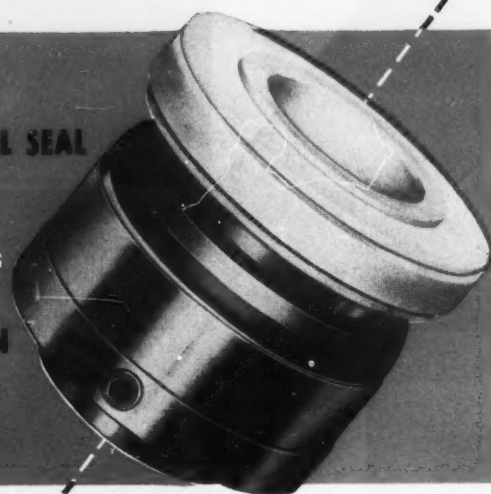


THE SHARPLES CORPORATION
2300 WESTMORELAND STREET • PHILADELPHIA 40, PENNSYLVANIA
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • NEW ORLEANS • SEATTLE • LOS ANGELES • SAN FRANCISCO • HOUSTON
Associated Companies and Representatives throughout the World

When inquiring check CP 2924 opposite last page

users say
Chemiseals pay
in longer trouble-free life---

**THE MECHANICAL SEAL
 OF TEFLON
 PRESSURE-
 BALANCED
 BELLOWS DESIGN**



Customers report unsurpassed performance in the following applications.

- | | |
|--|---|
| CONCENTRATED H₂SO₄ ACID . . . | Aurora Pump. 1750 r.p.m. 1½ inch shaft. 2 lbs. suction. 45 lbs. discharge. Temperature of medium 65°C. Not flushed. |
| UREA-WATER SOLUTION | Ingersoll-Rand Pump. 1750 rpm. 1½ inch shaft. 2 lbs. suction. 35 lbs. discharge. Temperature of medium 100°C. Not flushed. |
| HYDROCARBON FEED | Labour Pump. 1750 rpm. 1½ inch shaft. 10 lbs. suction, 25 lbs. discharge. Temperature of medium 102°C. Not flushed. |
| ADIPIC ACID and
HYDROCARBON SLURRY | Labour Pump. 1750 rpm. 1½ inch shaft. 35 lbs. suction, 75 lbs. discharge. Temperature of medium 70°C. Seal flushed. |
| UREA-NH₃ SOLUTION | Ingersoll-Rand Pump. 3600 rpm. 1½ inch shaft. 10 lbs. suction, 50 lbs. discharge. Temperature of medium 75°C. Not flushed. |
| ESTER (10% Solids) | Byron Jackson Pump. 3600 rpm. 625 lbs. discharge. 30 lbs. suction. Stuffing box pressure 15 lbs. to 65 lbs. Temperature of medium 70°C. Seal flushed. |
| HYDROXYACETIC and
SULFURIC ACID | Allis-Chalmers Pump. 1750 rpm. 1½ inch shaft. 10 lbs. suction, 60 lbs. discharge. Temperature of medium 30°C. Not flushed. |



U.S. GASKET • BELMONT PACKING

What are your shaft sealing problems? Write for Bulletin MS-1155.
UNITED STATES GASKET CO.
 Camden 1, New Jersey

When inquiring check CP 2925 opposite last page

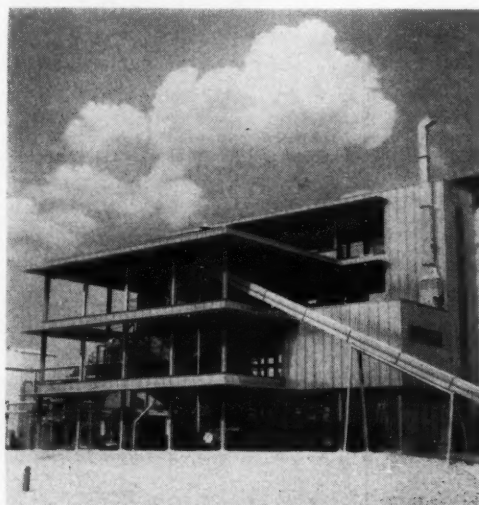
NEW SOLUTIONS of processing problems

**Complete extraction at low ratios
 of solvent to feed provided
 by compact rotary unit . . .**

unit designed with open-type construction handles 850 tons of soybeans per day

One important advantage of rotary extractor placed in service at Central Soya's Chattanooga plant in April 1955 is that complete extraction is obtained at low ratios of solvent to feed. Unit, which was the largest of its type ever built at the time of installation, stands 15' high and is 26'6" in diameter. It can handle 850 tons of soybean material per day. Although this type of unit was originally developed for extraction of soybeans, a number of successful installations have been made in which other materials are treated.

Other benefits achieved with the extractor at Central Soya include safe handling of a hazardous solvent, small space requirement for unit, mechanical simplicity, and minimum maintenance.

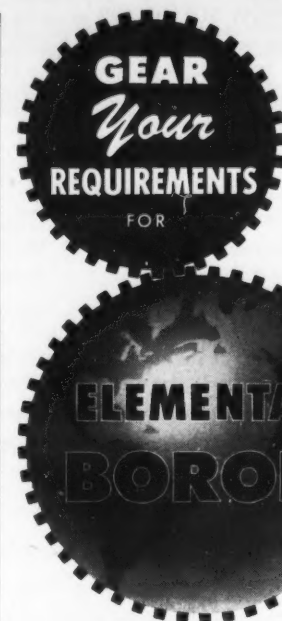


CP Staff Photo

Rotary extractor installation at Central Soya furnishes a maximum of safety while handling a hazardous solvent

Extractor consists of a cylindrical, vapor-tight black iron tank, which contains 18 cells divided like pieces of a pie. Interior section is mounted on a rotor which turns slowly, completing one revolution in about 40 minutes. Hexane, the solvent, is introduced near discharge hopper and is pumped counterclockwise in a series of seven stages. Soybean material enters unit by means of a vapor-tight screw conveyor coming from flaking rolls. Solids flow clockwise through cells. Freshest solvent is introduced just before flakes are discharged. Liquid draining from cells collects under rotor in compartments and is withdrawn by stage pumps.

Optimum extraction is attained by proper choice of the draining period. In this soybean extraction



**TO THE WORLD'S
 LARGEST
 Producer**

Amorphous Elemental Boron has moved out of the laboratory into full commercial production. The proved uniformity and high purity of Trona's elemental boron undoubtedly has an application in your research, development or manufacturing program. You are invited to avail yourself of the experience and specialized knowledge gained in the production of 90% (plus) pure Boron by the world's largest producer of this vital chemical element.



**American Potash
 & Chemical Corporation**

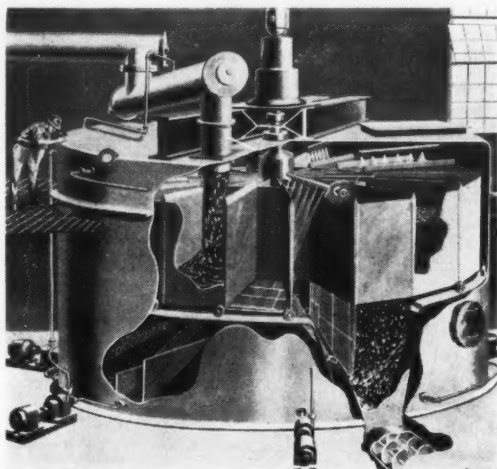
3030 West Sixth Street
 Los Angeles 54, California
 99 Park Avenue
 New York 16, New York



When inquiring check CP 2926 opposite last page

CHEMICAL PROCESSING

process, each cell is flooded for two minutes as it passes under a solvent unit manifold, then drained for one minute. When solvent is sprayed over a bed, none drains until the flakes soak up the static holdup (0.008 cu ft of hexane per lb of flakes). As rate of flow increases, holdup increases until bed is flooded. When flow is discontinued, bed drains, rapidly at first, then more slowly as total holdup approaches static holdup asymptotically. Each cell holds 2200 lb of raw flakes while entire unit contains about 6000 to 8000 gal of solvent while operating.



Interior view of rotary extractor shows flake charging and discharging operations

One factor contributing to the safety of the operation is the underground surge tank which is normally empty while plant is operating. All of the solvent drains to this underground tank during a shutdown. Also, vessel is purged with inert gas before and after a shutdown. Unit is completely equipped with explosion-proof electrical enclosures. Open-type construction is also a factor in reducing possible hazard, as well as lowering original construction costs.

(Rotocel extractor is a product of Chemical Plants Div., Blaw-Knox Co., Dept. CP, PO Box 778, 930 Fort Duquesne Blvd., Pittsburgh 30, Pa. . . or for more information check CP 2927 opposite last page.)

Gives service tips for pyrometers

Booklet of eleven pages gives service tips on maintenance of pyrometers and pyrometer controllers. Trouble indications are given, together with suggested repair procedures. Booklet represents an accumulation of information gained by the manufacturer.

Service Tips Bulletin F 7259 is issued by Barber-Colman Co., Dept. CP, 1300 Rock St., Rockford, Ill. Specify CP 2928 opposite last page.

Wagner
ELECTRIC MOTORS
... the choice of leaders
in industry

New NEMA Frames
Standard and Explosion-proof



Type EP
215 Frame

Wagner Totally-Enclosed Fan-Cooled Motors *cut maintenance time and costs*

Check the features of the new *Wagner Type EP Totally Enclosed Motor*. They spell the difference between needless expenditures in maintenance time and costs . . . and a definite savings in motor upkeep and repairs. You'll find that for general industrial use where dust, dirt, filings, abrasives, steel chips or moisture are present, the *Wagner Type EP Motor* gives steady, troublefree performance and longer service life.

Wagner Type JP Explosion-Proof Motor . . . has the same quality construction as the *Type EP*—plus added features which make it completely safe to operate where explosive dust, gases or vapors are present.

Both *Type EP* and *JP* *Wagner* motors are available in ratings up to 250 horsepower. For complete information, just call the nearest of our 32 branch offices, or write for Bulletin MU-203.

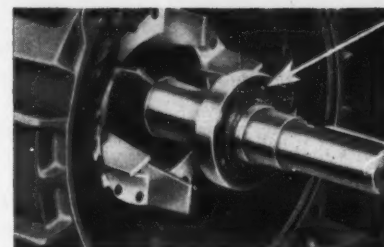
Wagner Electric Corporation
6359 Plymouth Ave., St. Louis 14, Mo.



M55-16

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS-AIR AND HYDRAULIC

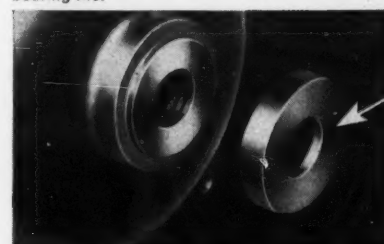
BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES



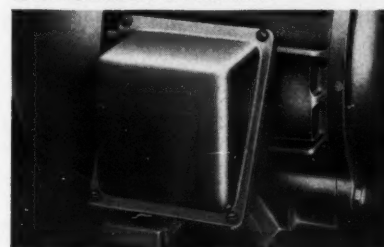
1 HEAVY-DUTY BALL BEARINGS—Highest quality bearings of more than ample capacity provide long, troublefree service.



2 BEARINGS CAN BE RE-LUBRICATED—Wagner motors can be re-lubricated when necessary to prolong bearing life.



3 BEARINGS STAY CLEAN—Both ends of these motors are equipped with running shaft seals, a machined collar mounted on the motor shaft.



4 EASY TO CONNECT—Large diagonally-split conduit box provides ample room for making connections. Leads are permanently identified.

5 NO GREASE LOSS—Bearing housings have effective seals to prevent escape of grease.

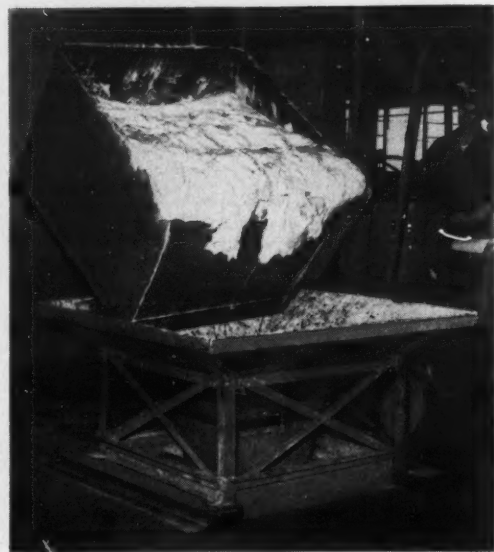
6 RIBBED FRAME—Ribs on the corrosion-resistant cast iron frames add mechanical strength and increase the surface area for more efficient cooling.

When inquiring check CP 2929 opposite last page

**Mobile bin system speeds handling
in rare earth, thorium plant . . .**

ore, filter cake, other solids moved economically with minimum amount of effort

Producing rare earth and thorium chemicals from monazite ore is quite a job at Lindsay Chemical Company, West Chicago, Illinois. Most operations are batchwise and require considerable movement of material. However, thanks to an efficient tote



CP Staff Photo

Operator dumps contents of tote box into hopper feeding reactor on lower floor

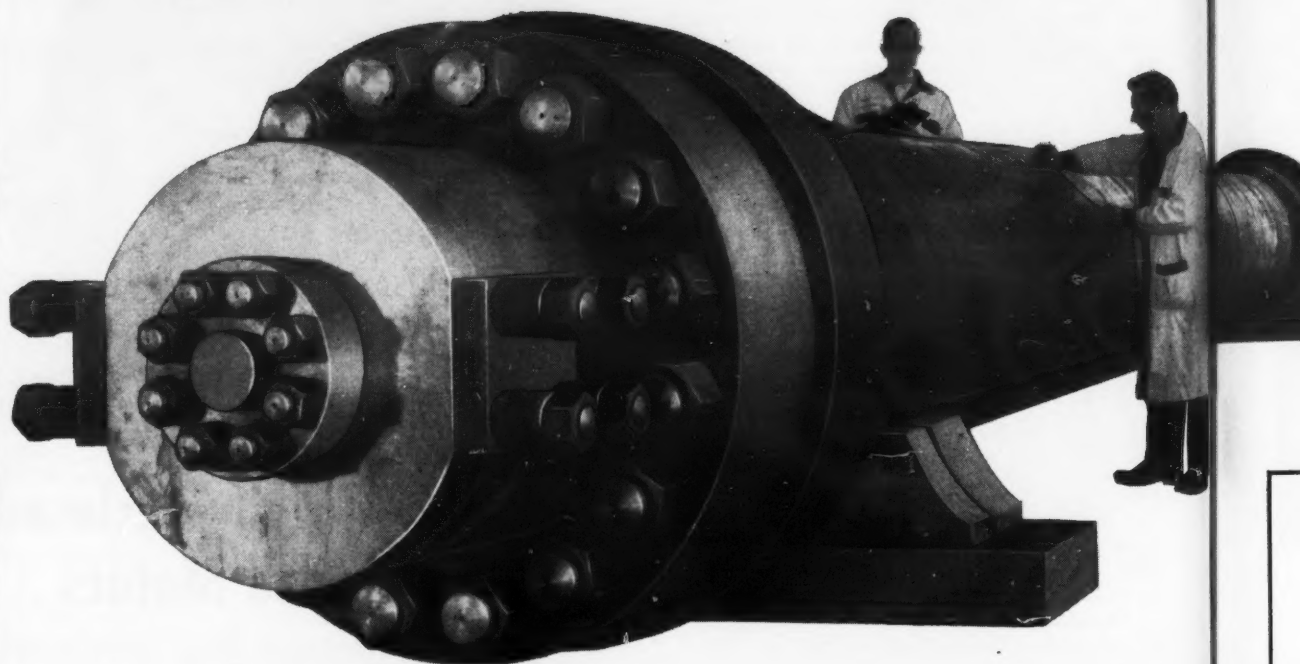
box material handling system, ore, filter cake, and other solids are transferred about the plant speedily and economically with a minimum amount of effort. Company is largest US producer of rare earth and thorium chemicals.

About 100 tote boxes are used in the plant. Boxes are made from 7 gage pressed steel and cost about \$60 each. Measuring 42x42x27" high, boxes have 3000 lb capacity.

A 4000 lb capacity Towmotor lift truck is used to move the containers around the plant. Truck can lift boxes to height of 144" and has a hydraulically-operated revolving-head attachment which rotates 360° in either direction — making dumping of tote box contents a relatively simple job. When not used to convey materials, boxes make convenient storage containers too.

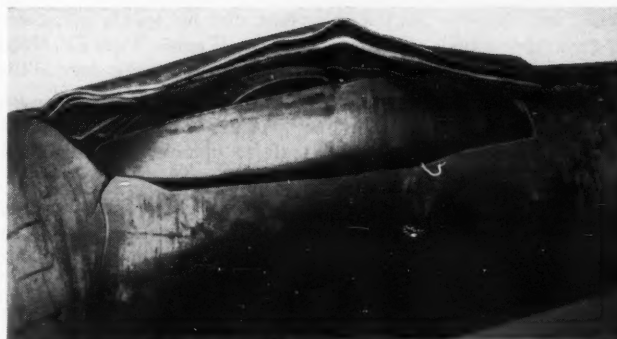
(Tote Boxes are products of Powell Pressed Steel Products Company, Department CP, Hubbard, Ohio . . . or for more information about manufacturer's product reader may simply check CP 2930 on convenient Reader Service slip which is located opposite last page.)

8000 pressure vessels . . . 80 ex

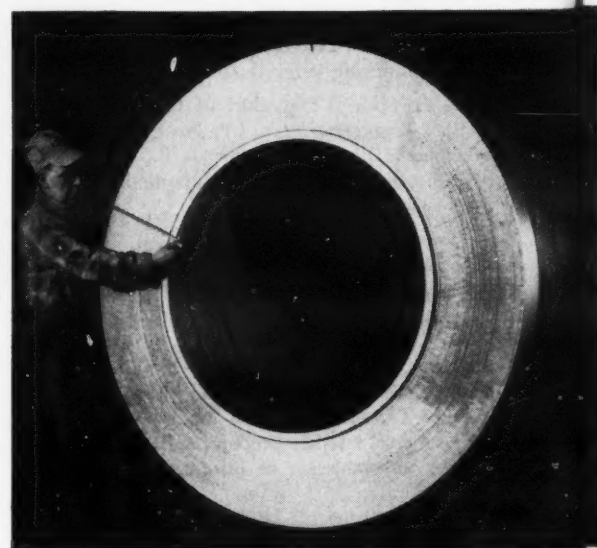


MULTI-LAYER AMMONIA CONVERTER

Built for operating pressures of 12,500 psi.
... test pressures of 18,750 psi.
Wall thickness 9 $\frac{1}{16}$ in. . . I.D. 25 $\frac{3}{16}$ in.
Overall length is 44 ft. Weight 238,000 lbs.



SAFETY — Nearly 8000 MULTI-LAYER vessels in operation — and not a single failure — certainly convincing proof of the safety inherent in this unique A. O. Smith design. To further prove operating safety, we have actually tested many full-scale, high-pressure MULTI-LAYER vessels to destruction. In every case, vessels rupture without shattering or fragmentation.

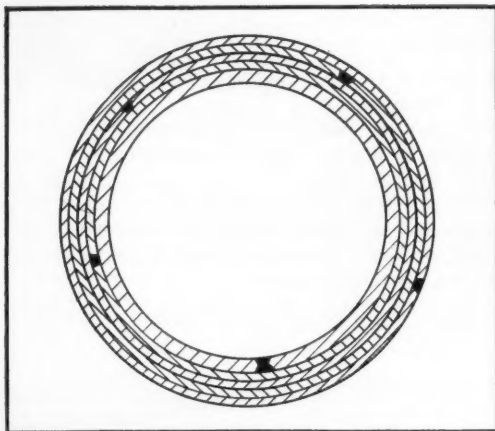


...8000 reasons why you can depend on exclusive **MULTI-LAYER** CONSTRUCTION

FOR SAFETY

FOR ECONOMY

FOR FLEXIBILITY



ECONOMY — Savings start with fabrication. Instead of using thick plate in a single wall, **MULTI-LAYER** vessels are built up from concentric layers of relatively thin steel plate . . . progressively wrapped, tightened and welded together around an inner, pressure-tight cylinder. No need for costly stress-relieving in field assemblies. And for corrosive operations, only the inner shell requires special alloys.

FLEXIBILITY — With **MULTI-LAYER**, there's no limitation of size or weight for your vessel design. You can design for higher pressures, too. Walls can be made stronger simply by increasing the strength of the steel used or by adding more layers. Since shell sections can be welded together in the field, vessel length is not limited.

See how A. O. Smith's exclusive **MULTI-LAYER** construction can provide safety, economy and flexibility in your own operations. Write our nearest office. We'd be happy to provide more detailed information about **MULTI-LAYER** construction for high-pressure vessels.

Through research  . . . a better way

A.O. Smith

C O R P O R A T I O N

PROCESS EQUIPMENT DIVISION

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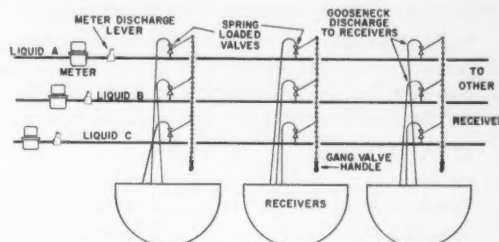
INTERNATIONAL DIVISION: Milwaukee 1, Wisconsin

Licensee in Canada: JOHN INGLIS CO., LTD.

NEW SOLUTIONS of processing problems

Speed liquid batch proportioning, guarantee against too much of any component

Problem: One step in operations at Post Cereals calls for metering each of three liquid ingredients into a set of four receivers. Frequency of batching is too high to allow manual valves to be used to select proper receiver for each batch. And manual



Schematic drawing of metered batching system shows three of the four receivers. Actually, any number of receivers could be used without sacrificing accuracy

valves also allowed the possibility of careless operation where too much of some component might be added.

One solution considered was installation of 12 preset meters. While nothing was wrong with the theory, a method to give the same accuracy and safety using only three meters was developed.

Solution: At the suggestion of the coating operator, a method was worked out using spring-loaded valves. As shown, scheme employs three preset controlling meters (one for each liquid component) and a set of three valves for each receiver. Spring-loaded valves are placed directly over each receiver and provided with a gooseneck to deliver ingredient. All three valves for each receiver are ganged by connecting to same operating chain. Gooseneck also prevents draining the header line for any material after proper amount of material has been delivered through meter.

In operation, required ingredient quantities are set on each of the three meters and meter discharge lever is tripped. Operator then goes to receiver to be filled and pulls down on the handle to open all three valves. These valves are held open until the last of the material has been delivered. When handle is released, line is sealed and another batch can be set up by again tripping preset meters.

Results: Using this system Post has been able to achieve the same accuracy with three meters that could have been achieved using twelve meters to feed three ingredients into each of four receivers. Goosenecks prevent any trouble with draining of the headers which might affect accuracy.

(Preset meters for this installation are Auto-Stop meters manufactured by Neptune Meter Co., Dept. CP, 50 W. 50th St., New York 20, N. Y. . . . or check CP 2932 opposite last page.)

When inquiring check CP 2931 opposite last page

Lapp Valves are Solid Porcelain

You need to make no compromise with contamination or corrosion from valves in chemical processing. Lapp valves are of *solid* Lapp Porcelain, a material unique as a ceramic for industrial scale chemical service. It alone offers the following combination of characteristics and qualities:

PURITY • Lapp Porcelain is a potassium aluminum silicate, made from selected clays, flint and feldspar...has no free iron or other metallic impurity.

NON-POROUS • Complete vitrification of all sections, through firing to 2300°F., provides zero porosity. No dye penetration of body in 100,000 psi test. No chemical can penetrate in service.

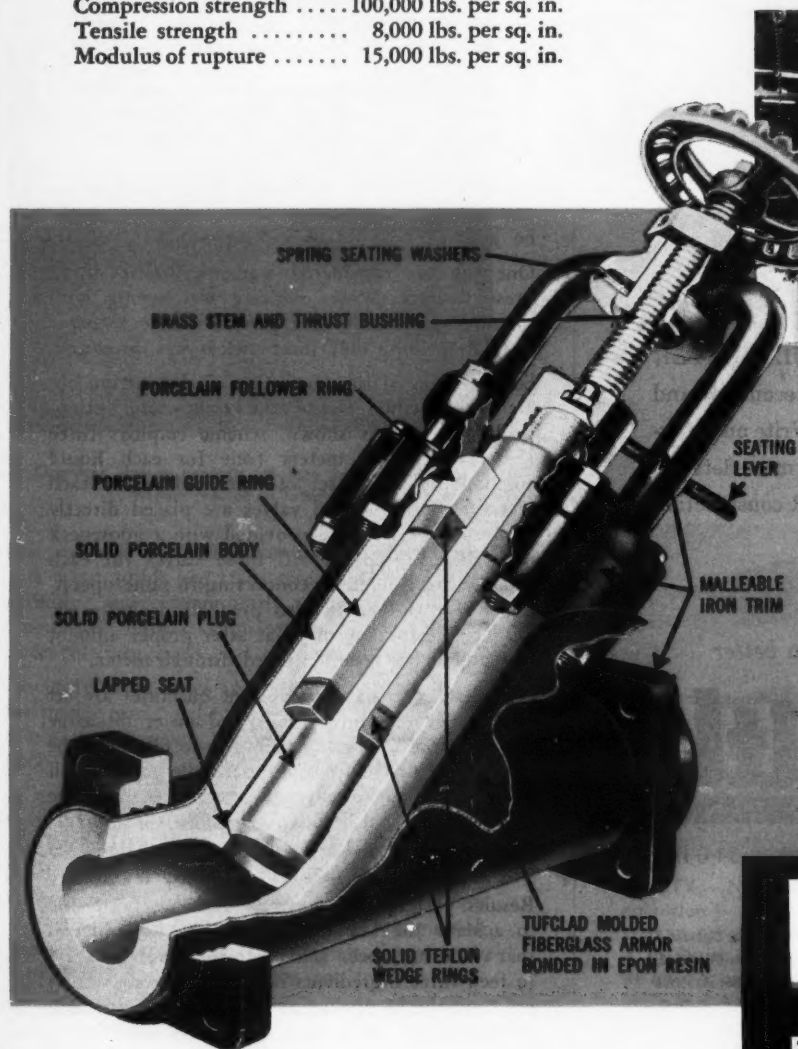
HIGH MECHANICAL STRENGTH

Compression strength 100,000 lbs. per sq. in.
Tensile strength 8,000 lbs. per sq. in.
Modulus of rupture 15,000 lbs. per sq. in.

CHEMICAL RESISTANCE • Lapp Porcelain is unaffected by any acids except HF. It provides years of trouble-free service, handling hot acids in all concentrations, as well as mixed acids and other troublesome combinations.

UNIFORM QUALITY • Lapp Porcelain has been manufactured for 38 years for use in most severe chemical, electrical and mechanical services. Plant facilities include Lapp-patented vacuum processing, deaerating pug mills, two continuous tunnel kilns, and complete chemical, electrical and mechanical test equipment.

Write for bulletin with complete description, characteristics, and specifications. Lapp Insulator Co., Inc., Process Equipment Division, 437 Wendell St., LeRoy, N. Y.



An electrical test is the most searching inspection for physical soundness! Porcelain bodies for Lapp valves above are being flashed over—at 70,000 volts for three minutes. Any physical defect is revealed as an electrical puncture.



Y-valves, angle valves, flush valves, safety valves, and plug cocks of Lapp Porcelain have standard bolt-circle flanges for easy connection to all piping and equipment.

Lapp

PROCESS EQUIPMENT

Chemical Porcelain Valves • Pipe • Raschig Rings
Pulsefeeder Chemical Proportioning Pumps

NEW SOLUTIONS of processing problems

"Glass-lined" tablet drying room constructed with combination insulation, wall finish . . .

cellular glass block material resists moisture, is key factor in maintaining precise temperatures

Problem: Departing from the conventional method of drying prescription level endocrine and pharmaceutical tablets in commercial ovens or furnaces, engineers of Schering Corporation, Union, New Jersey, planned to use an entire room for a drying area. Problem was to find an insulating material that not only would prevent heat loss from room, but also would resist contamination and moisture.

Solution: After investigating several types of insulation, engineers selected a cellular glass material called "Duraface Foamglas".

Supplied as 18 x 12 x 4" thick blocks, the insulation was installed as the finished interior wall without the need of plaster or similar surfacing. The outside face consists of a hard white impact-resisting, durable surface fused integrally with the block during the manufacturing process.

Blocks were applied with a cold adhesive to room's



Glass blocks were applied with cold adhesive to cinder block walls



Drying room has interior walls built of cellular glass blocks. Surface is washable, will not peel or crack off

When inquiring check CP 2933 opposite last page

8" cinder block walls. Vapor-barrier compound was troweled between joints of block. Outer edges are beveled to facilitate joint sealing. Composed of millions of glass-enclosed air cells, the blocks are vapor-proof. Glazed tile was used on exterior wall.

Room measures 15 x 18'. Ceiling height is 8'. Heated air is discharged through 18" ceiling outlet equipped with directional louvers. Tablets are placed in stainless steel trays and put on mobile racks, where they are dried and hardened overnight at selected carefully-controlled temperatures.

Results: Permanent effectiveness of the insulation is a key factor in maintaining precise temperatures for the drying operation. Maintenance requirements are negligible because surface of blocks needs no paint. Moreover, surface is washable. It cannot peel or crack off because it is part of block and not a finish applied after manufacture. In effect, drying room is glass-lined, providing a high degree of permanent sanitation.

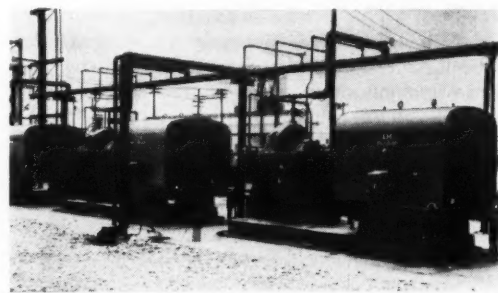
(Duraface Foamglas is product of Pittsburgh Corning Corporation, Dept. CP, One Gateway Center, Pittsburgh, Pa. . . or for more information check CP 2934 on handy form opposite last page.)

Silicone insulation and coatings help keep motors running at Dow Chemical . . .

provide high resistance to rust and corrosion from salt spray, humidity on Gulf Coast

Motors with coils fully insulated with silicone tapes, rubbers, and varnishes, and metal parts protected by baked-on silicone finishes, resist corrosion, rust, and electrical breakdown due to salt spray and high humidity at Dow Chemical Co.'s Freeport, Texas plant. Units have been in service outside for about a year in humidity near saturation most of the time. Prevailing southeast winds bring salt sprays into the plant site even in fair weather.

(Please turn to next page)



Protective hood can be removed for maintenance and cleaning

DUST DISAPPEARS LIKE MAGIC!

A little air (50 cfm), proper hooding and the right ROTO-CLONE Dust Collector can do the trick—ECONOMICALLY



NOW YOU SEE IT!

Grinding operation before dust control.



NOW YOU DON'T!

Grinding operation after dust control.

Are you conveying, screening, grinding (as above), weighing or packing dry materials? Then the picture at the left may be familiar. Dust "dogs your footsteps" everywhere!

Now, look at the scene at right. Everything clean and serene! Good exhaust hood-design reduced needed air volume to a minimum—50 cfm—making it inexpensive and practical to apply efficient dust control. Resulting benefits? You know them well—

AAF's more than 20 years' experience covers the entire range of industrial dust control problems—has resulted in today's complete line of ROTO-CLONE* Dust Collectors. Whether your dust problem involves a single machine, a complete department or an entire plant operation, this experience can point the way to "short cuts", economies—and results. For complete information, call your local AAF representative or write us direct.

AAF American Air Filter
COMPANY, INC.
258 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.



AAF Dust Control Equipment



Illinois Steam Heating Specialists

BETTER AIR IS OUR BUSINESS

AAF Filters and Precipitators

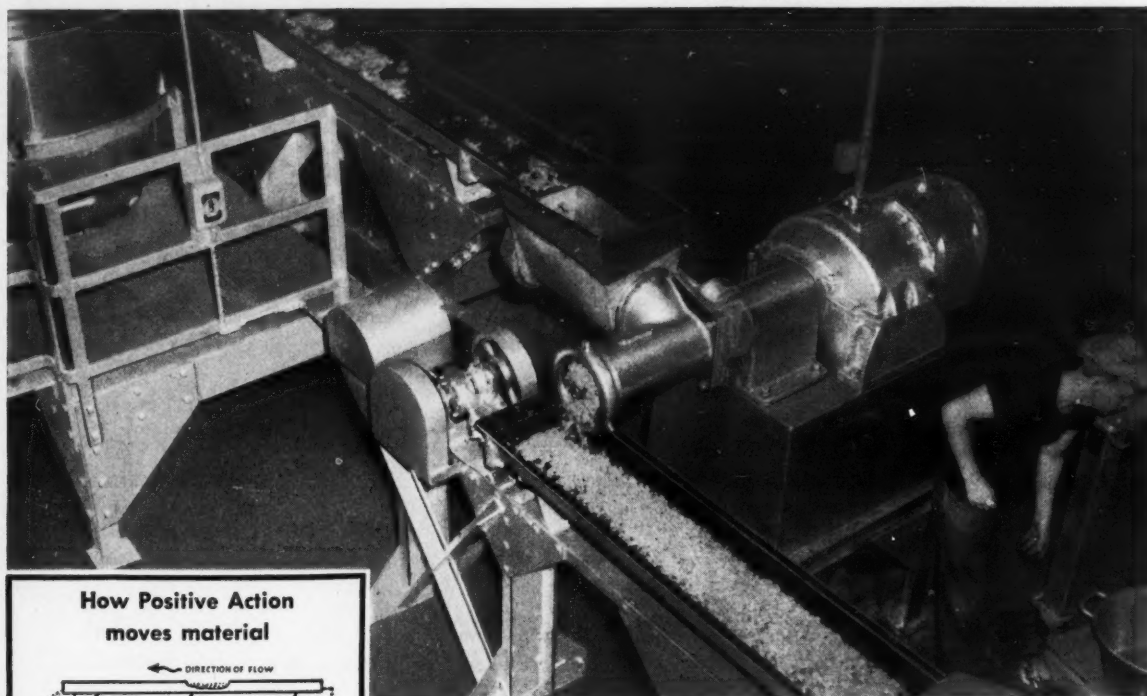


Herman Nelson Industrial Heaters

When inquiring check CP 2935 opposite last page

ARRANGE YOUR OWN

oscillating conveyor system
from stock components



How Positive Action
moves material



Positive-action, constant-stroke eccentric drive provides a powerful, yet gentle upward and forward oscillating motion. Large volumes of material are moved in a uniform, continuous flow, regardless of surges. Resonant spring action of resilient legs cuts power requirements to a minimum. Only maintenance is drive lubrication.

LINK-BELT
FLEXMOUNT OSCILLATING CONVEYORS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.



LINK-BELT FLEXMOUNT OSCILLATING CONVEYORS are pre-engineered—can be bought from local stocks. Standard sections of 8, 12, 18-in. widths make selection easy . . . assembly simple. Heavy-duty 36-in. wide units are also available from local stocks.

Typical of flexible arrangements possible with FLEXMOUNT is this conveyor combination carrying meat to and from a grinder. Stock sections can be built to any length desired . . . up to 100 ft. with a single motor. Dividers are available for simultaneous handling of two or more materials, and metal covers can be added for dust-tight enclosure.

EASY to order . . . easy to install, economical Link-Belt FLEXMOUNT conveyors are an established answer for a wide range of hard-to-handle materials. Whether pulverized, granular or lumpy . . . hot or cold, wet or dry, corrosive or abrasive—effective handling can be arranged with a minimum of engineering detail.

When your material moves on FLEXMOUNT . . . positive, jam-

proof action plus safe, compact, leak-proof design provide top efficiency and capacity. And if sanitation is among your requirements, you'll welcome the ease of cleaning these conveyors.

See the versatile Flexmount at your nearby Link-Belt Factory Branch Store or Authorized Stock-Carrying Distributor, or write for Book 2478.

NEW SOLUTIONS of processing problems

(Continued from preceding page)

Each of the motors is 450 hp, 1200 rpm, operated on 2300v, and drives a 5500 gpm Ingersoll-Rand centrifugal pump. Armature coils are insulated with silicone rubbers, tapes and varnishes. Entire winding is varnished and baked three times. Metal parts are protected by baked-on silicone finishes except for those in intake air stream, such as screens, baffles, and blowers, which are of stainless steel.

Silicone-insulated coils have a high heat capacity, excellent electrical insulating properties, resist moisture penetration, and are unaffected by salt deposits. Protective hood on motors can be removed for maintenance and cleaning. Ventilating system is designed so that air-borne particles are taken out of air stream before they reach inside of motor.

(Sil-Clad motors are a product of Electric Machinery Mfg. Co., Dept. CP, 800 Central Ave., Minneapolis 13, Minn. Check CP 2937 opposite last page.)

RESEARCH LABORATORY



"Oh, I just add a pinch of this and a dash of that!"

WE'RE LOOKING FOR CARTOONS!

Ken Quetchenbach of Eastman Kodak thought up this "funny" and sent it to us. We laughed, figured you'd laugh, so we printed it. Result: Ken is \$10 richer.

CHEMICAL PROCESSING will pay \$10, on acceptance, for each completed cartoon (in black ink, ready to reproduce). We'll pay \$5 for each accepted cartoon idea (without the drawing).

Only stipulations are that you be a reader of CHEMICAL PROCESSING, working in the chemical processing industries . . . that the cartoon touch on some phase of the industries . . . and that it's original.

Send your cartoons or ideas to:

Cartoon Editor
CHEMICAL PROCESSING
111 East Delaware Place
Chicago 11, Illinois

When inquiring check CP 2936 opposite last page

Metal gratings make safe, functional floors, stairs in phosphate plant . . .

permit drainage of water used in washer operations

Problem: Between 18,000 and 20,000 sq ft of open steel flooring and several hundred stair treads were required for two buildings of Armour and Company's phosphate recovery plant, Bartow, Florida. Flooring and treads had to be open to permit drainage of water used in washer operations. Plant is one of largest single units producing pebble phosphate and concentrates.

Solution: Company installed expanded metal gratings and treads in the buildings. Floor spans were maintained at 30" to 36" to provide adequate strength with minimum deflection under ordinary pedestrian loads. Stair treads are a single piece of 4.27-lb expanded metal turned to 90° angle at front and rear edges. This forms a kick plate and also strengthens tread.

Most of treads are 36" long and will support a 200-lb man at midspan with no apparent deflection. A 1 1/4"x1 1/4" angle is welded to the mesh at either end to provide a fastening plate.

Results: Gratings provide strong, durable, and lightweight surface. Because they are open mesh, they do not block light and air. Dirt and grease cannot collect on walking surface. In addition, ridges of the steel strands make them non-slip. Symmetrical pattern is attractive in appearance — viewed from above or below.

(Penmetal gratings are product of Penn Metal Company, Inc., Dept. CP, 205 E. 42nd Street, New York 17, N. Y. Check CP 2938 opp. last page.)

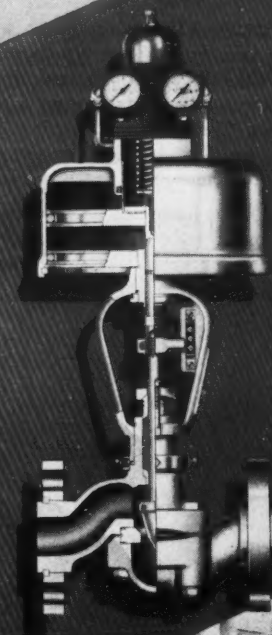
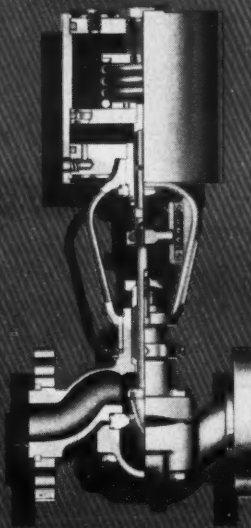
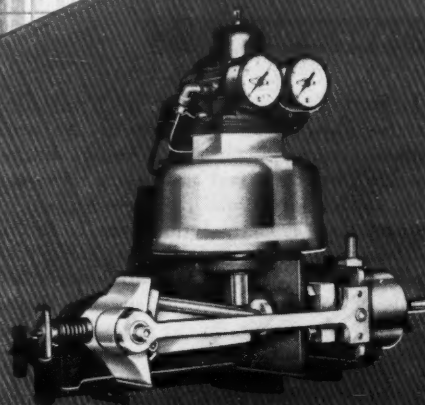
Water-cooled rectifier transformers cut floor space requirements at Anaconda Aluminum

Using water-cooled rectifier transformers instead of self-cooled ones on aluminum pot lines has resulted in a number of operating advantages at Anaconda Aluminum Company, Columbia Falls, Montana. Transformer floor area is reduced to less than half, weight is decreased by 35%, cost is less.

Sixteen rectifier transformers are used, eight for each of two 100,000-ampere, 700-volt pot lines. Each 10,200-kva transformer takes power at 13.8 kv and feeds it into a 12,500-ampere ignitron rectifier unit at 700 volts. The eight rectifiers in parallel supply the 100,000-ampere pot line. Units are said to be the first in this service.

(Water-cooled rectifier transformers are product of Westinghouse Electric Corporation, Dept. CP, 401 Liberty Avenue, Box 2278, Pittsburgh 30, Pa. . . . or check CP 2939 opposite last page.)

Reward your process WITH THE BEST IN CONTROL VALVES



You reward your process with the best in control valves when you call for Annin Domotor Control Valves, specified by engineers responsible for the most advanced processes throughout the world. Domotor control valves are no longer new, but they are still the most advanced fluid control valves available anywhere. Whether your primary problem is control accuracy, tight closure, resistance to erosion and corrosion, wide rangeability or low maintenance, you, too, should insist on Domotor Control Valves, produced by The Annin Company, valve manufacturer of valves DESIGNED for modern automatic control.

Write now for your copy of Annin's new catalog on valves for fluid control.

ANNIN THE ANNIN COMPANY
1474 EAST TELEGRAPH ROAD, LOS ANGELES 31, CALIFORNIA
Control VALVES

When inquiring check CP 2940 opposite last page

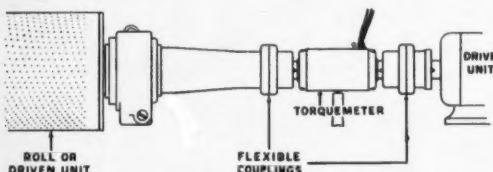
**Paper machine efficiency upped
by torquemeter . . .**

cuts power requirements, increases wire life

Problem: Excessive power was being used by 196" Trim Fourdrinier type board machine at Gaylord Container Corporation, Bogalusa, Louisiana. Numerous machine changes were made without success. Changes were tried at the wet end too, but wire life dropped off when attempts were made to remove too much water at the flat boxes.

Solution: Inasmuch as all the above changes had been made more or less blindly, engineers decided to install a device whereby they could continuously observe the effects of the machine changes on power requirements. A Downingtown torquemeter using a Baldwin SR-4 Torque Pickup (load cell) of 200,000 inch-pounds capacity, was mounted on in-shaft of couch of paper machine.

Torquemeter is hooked up to continuous recorder. Couch drive torques are indicated and recorded on the instrument which is located at the wet end of the machine. Torque pickup for the torque-



Torquemeter is mounted on in-shaft of paper machine

meter consists of SR-4 resistance wire strain gages bonded on a 5/4" diam shaft 31/2' long over the couplings. Electrical impulses produced by shaft strain and proportional to shaft torque, are transmitted by Wheatstone bridge of strain gages in the torque pick-up through slip rings to recorder.

Results: Ability to measure power input continuously has resulted in machine and operating technique changes that have reduced power requirements, machine maintenance, and down time. Changes in loading on wire can be observed while machine is running. This has increased wire life 25%. Torque measurements also simplify "nursing" of a worn wire until a convenient shut-down time.

Torque record also shows any change in pulp. When a carload of "bad wood" goes through, it can be detected by effects on drive shaft torque. Any change in consistency of the Jordans is also indicated on chart. Power can be adjusted to minimum requirements for each type of paper.

(Torquemeters are product of the Downingtown Manufacturing Company, Dept. CP, 49 Holland, Downingtown, Pa. Check CP 2941 opp. last page.)

(SR-4 load cells used in torquemeters are product of Baldwin-Lima-Hamilton Corporation, Dept. CP 940 Simpson Street, Philadelphia 42, Pa. . . . or check CP 2941A opposite last page.)

HOW TO FIGURE THE COST OF STEAM TRAPS

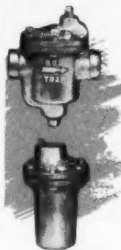
STEAM TRAPS are something like wives. First, there is the cost of securing one and installing it in its new home. Then, there is the cost of maintaining it. Now, everyone knows that some wives are frugal and help their husbands a great deal, while others are frivolous spend-thrifts. It is the same way with steam traps. You have to figure the original installed cost, the maintenance cost and the effect on general operation.

Divide the total expenses by life of the trap and you get down to the real heart of the matter—the *cost per year*. This is where Armstrong steam traps really shine! Let's take a look at the details:

DIRECT TRAP COSTS



1. First Cost. The price of Armstrong traps is low in terms of capacity. An optimum relationship between leverage, bucket weight, bucket travel and orifice size gives big capacity in a small package. Armstrong steam trap capacity ratings are based on actual tests with condensate at steam temperature and with actual hookups. They tell you what the trap will deliver *on the job*. This is not generally the case with other trap ratings.



2. Installation Cost. In four of the most widely used sizes, Armstrong traps are available in either side inlet—side outlet or bottom inlet—top outlet body styles, making possible the simplest, lowest cost installation.



3. Maintenance Cost. 40% less maintenance with Armstrong traps is the average of all the maintenance reduction reports secured from users over a period of years. This is due to high quality of parts, generous safety factors and inverted bucket know-how.



4. Repair Parts Cost. Armstrong heat treated chrome steel valve parts, precision ground and lapped, last a long time. When they do require renewal, a complete new valve mechanism right off the factory production line transforms an old trap into a new one at low cost.



ARMSTRONG MACHINE WORKS

880 Maple Street • Three Rivers, Michigan

INDIRECT COSTS



1. Cost of Steam Waste. This cost occurs through leaky trap valves, through traps that stick open or lose prime, through extra hours of operating heat transfer equipment due to poor drainage. This is a cost you can eliminate with Armstrongs.



2. Cost of Efficiency Losses. Poor trapping cuts heat transfer efficiency. Figure how much 10% loss affects the return on a \$5000 production unit, or a \$1,000,000 plant. Armstrong traps discharge condensate and air as fast as it accumulates, keep steam equipment at peak productive efficiency.



3. Cost of Downtime. Armstrong traps stay on the job long and faithfully, eliminating the production losses caused by excessive downtime for maintenance.

A steam trap casts a mighty big shadow that is multiplied by the number of traps in a plant until it has a major effect on operating costs. When you figure the costs from all angles you will find it pays to specify "traps shall be Armstrong."

FREE: STEAM TRAP BOOK

—44 pages of prices, design, selection, installation and maintenance data on Armstrong steam traps. You are welcome to a copy. Call your local Armstrong Representative, or write.



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YOU CANNOT BUY A BETTER TRAP THAN AN ARMSTRONG...

Here Are Some Questions for Cost Comparison

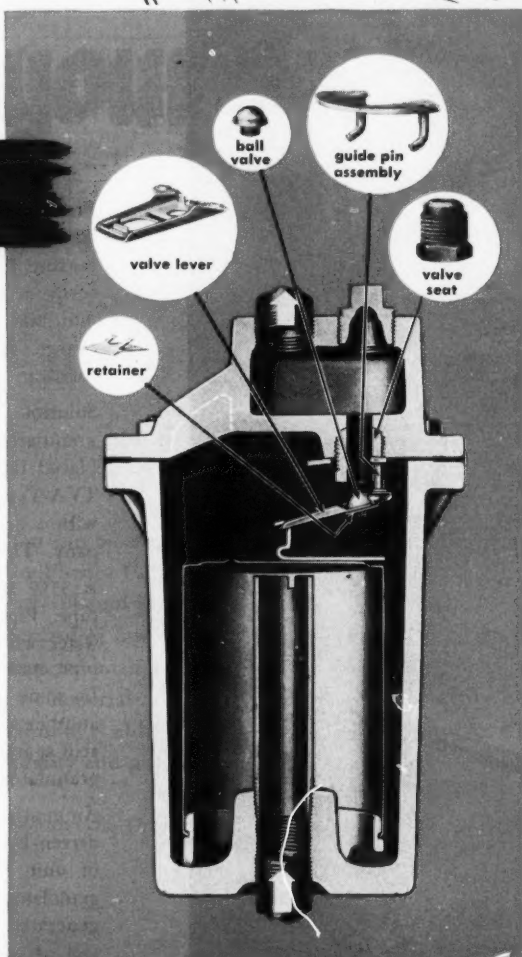
1. Will the valve stay steam-tight for 2 to 3, or even up to 10 years depending on the service?
2. Will the trap discharge condensate at steam temperature to keep equipment hot and minimize non-productive radiation losses?
3. Will the trap automatically discharge air in sufficient volume to keep equipment at peak temperature and to prevent corrosion?
4. Is there enough safety margin of power in the bucket and lever to open the trap when the orifice enlarges slightly due to wear?
5. Can the trap stick in open position?
6. Is the trap apt to lose prime?
7. Are the published trap capacity ratings accurate and reliable for trap selection purposes?
8. Will the trap cleanse itself of ordinary dirt and scale?
9. Is the trap easy to install, inspect and repair?
10. Is the trap unconditionally guaranteed to give complete satisfaction?

If the trap is an Armstrong, the answer to each of these questions is favorable!

ARMSTRONG STEAM TRAPS

When inquiring check CP 2942 opposite last page

JANUARY, 1956

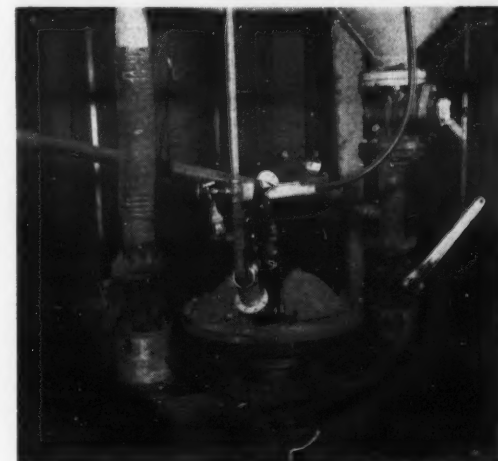


NEW SOLUTIONS of processing problems

Units pump abrasive slurry containing 60% solids...

in operation at Manganese Chemicals Corp.

Problem: At Manganese Chemicals Corp., Riverton, Minn., a method of pumping an abrasive slurry containing 60% solids was required. Material, coming as the underflow from thickeners, had to be transferred to a still to be stripped of NH_3 and CO_2 in company's MnCO_3 process.



CP Staff Photo
One of diaphragm slurry pumps in operation at Manganese Chemicals Corp.

Solution: Among a number of pumps considered, the only one that could satisfactorily handle the heavy slurry was the diaphragm pump shown in accompanying photograph. Several of these were placed in service at Manganese Chemicals in Sept. 1954. This unit utilizes a flexible reinforced rubber diaphragm actuated without mechanical linkage.

If rubber is not suitable, diaphragms are also available in neoprene and various flexible synthetics. An air pressure of 60-70 psi, exceeding the dynamic head by approximately 5 psi, is applied to diaphragm at regular intervals to force slurry through pump. Diaphragm will operate under a pressure as high as 100 psi. Each time air pressure is released by electric timer about six gal of the slurry is moved. Maximum capacity is about 90 gpm or 15 strokes per min at six gal each.

A three-way solenoid valve is used to control the air. Rate of flow can be changed without stopping operation.

Results: Diaphragm pumps have satisfactorily handled the abrasive slurry containing 60% solids.

(ODS pumps are product of Dorr-Oliver Inc., Dept. CP, Barry Place, Stamford, Conn. . . or for more information check CP 2943 on form opposite last page.)

Specially-designed ammoniator-granulator which permits more of economical nitrogen solution to be used —

cuts fertilizer formulation costs

Results in product with higher plant food value and uniform granularity that makes it handle well in distribution equipment

By **GORDON WEYERMULLER**, Associate Editor
With **FREMONT LANGE**, General Manager
Arkmo Plant Food Co., Walnut Ridge, Ark.

Problem: Conventional mixer used for ammoniation and granulation of fertilizers did not allow moisture or heat to escape, thereby causing reversion of some of available phosphorus to the insoluble form, decreasing the plant food value of the product. In order to minimize reversion, some ammonium sulfate had to be used in charge. Since ammonium sulfate is more expensive than nitrogen solution, this added to costs.

Solution: At Arkmo Plant Food Company, an ammoniator-granulator designed to overcome the foregoing objections, was placed in service when the plant went on stream March 1, 1955. TVA-Type ammoniator-granulator, which is used in combination with a dryer and cooler, was designed by Spencer Chemical Company. This equipment is used in process as follows:

A 37% ammonium nitrate solution is metered into liquid mixing pipe. Pipe is provided to mix nitrogen solution, ammonia, and water when all three are used in the same formula. From mixing pipe, material flows through a sparger into ammoniator-granulator. In some grades sulfuric acid is also added to this unit through another sparger. In other grades steam is added through the sulfuric acid sparger. Hence, all materials come together in the ammoniator-granulator.

Ammoniator-granulator consists of a 7' diameter cylinder, 8' long, driven by a 15 hp motor and variable-speed drive. First four feet of unit is used as the ammoniator and second four feet as the granulator. Air is blown on bed of material by one fan and steam generated by chemical reaction is removed by a suction fan. One end of unit is open to atmosphere to aid in dissipation of heat.

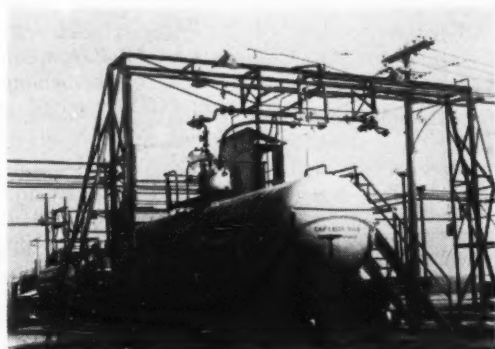
From ammoniator-granulator, material flows into dryer. Rotary

◀ Ammoniator-granulator (top left) and rotary dryer (bottom) at Arkmo Plant Food Company



dryer is 8' in diameter and 40' long. Unit is equipped with directional flights and lifting flights. Vibratory conveyor is used to move material to 7' diameter, 30' long rotary cooler, where temperature of material is reduced. From cooler, product passes through a drum and receives a coating of gas from the earth.

Design of plant permits the 37% nitrogen solution to supplant the portion of the charge which would otherwise consist of ammonium sulfate. Since ammonium sulfate costs 50% more per unit of N_2 than the nitrogen solution, this results in a considerable saving. Also use of the maximum quantity of ammoniating solution doubles the rate



Nitrogen solution is received in tank cars

of ammoniation. Plant can ammoniate to 5% NH_3 absorbed by the phosphate.


Present process prevents reversion of available phosphorus, resulting in a high plant food value for product. Finished material is clean, dustless, and uniform in size for easy distribution through farm implements, giving better crops. On certain grades plant normally operates at a rate of 10 tons of product per hour while on others runs as high as 21 tons.

(Spensol C 37% nitrogen solution is product of Spencer Chemical Co., Dept. CP, Dwight Bldg., Kansas City 5, Mo. Check CP 2944 opp. last page.)

(Ammoniator-granulator, dryer, and cooler were fabricated by Louisville Drying Machinery Unit, General American Transportation Corp., 139 S. Fourth Ave., Louisville 2, Ky. . . . or for more information check CP 2944A opposite last page.)

Looking for a chemical raw material or intermediate? . . .

The alphabetical Product Directory (pages 178 to 181) will help you find it in a hurry. This listing, started by CHEMICAL PROCESSING in 1938, "puts the finger" on all subjects and products in editorial columns and advertisements of each issue.



ORONITE CHEMICAL COMPANY

1956

SUN	MON	TUE	WED	THU	FRI	SAT
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6	7	8	9	10	11	12
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1957

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1958

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22	23	24	25	26	27	28
29	30	31				

your dependable source for Phenol

-- now and in years to come

You can be assured Oronite is a reliable source for Phenol U.S.P., now and years ahead. Oronite is the only Phenol producer in the United States with complete control of raw materials and manufacturing from start to finish—utilizing its own petroleum stocks as raw materials. As a completely integrated source of supply, Oronite is able to insure you Phenol of consistent quality and product when you need it.

Contact the Oronite office nearest you for complete information.

**Basic Chemicals
for Industry!**

ORONITE CHEMICAL COMPANY

EXECUTIVE OFFICES: 200 Bush Street, San Francisco 20, California

SALES OFFICES

450 Mission Street, San Francisco 5, Calif.

30 Rockefeller Plaza, New York 20, N.Y.

Carew Tower, Cincinnati 2, Ohio

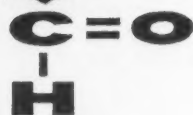
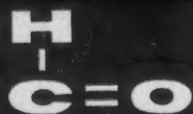
714 W. Olympic Blvd., Los Angeles 15, Calif.

20 North Wacker Drive, Chicago 6, Illinois

Mercantile Securities Bldg., Dallas 1, Texas

3592

When inquiring check CP 2945 opposite last page



OTHER HEYDEN INTERMEDIATES

o-Chlorobenzaldehyde
p-Chlorobenzaldehyde
o-Chlorobenzoic Acid
p-Chlorobenzoic Acid
2,4-Dichlorobenzoic Acid
3,4-Dichlorobenzoic Acid

HEYDEN BENZALDEHYDE

**a versatile intermediate
for dyes, pharmaceuticals,
chemicals, essential oils...
and YOUR NEW PRODUCT!**

Some of the applications for Benzaldehyde, such as in flavors and odorants, depend on the physical properties of volatility, odor and taste. Other uses—for instance, in the synthesis of dyes and drugs—are based on its chemical reactivity.

Which of these properties—physical or chemical—are of interest in the development of your new product? Heyden, the leading manufacturer of Benzaldehyde, offers two grades designed for various uses. The unsurpassed purity of Heyden Benzaldehyde N.F. (F.F.C.) makes it the preferred product for the formulation of cosmetics, odorants and flavoring agents. For use in organic syntheses, Heyden Benzaldehyde Technical can be depended upon for high quality and uniformity.

The Heyden sales office nearest you will welcome the opportunity to discuss your requirements, or see that you receive samples and technical information.



HEYDEN

CHEMICAL CORPORATION

342 Madison Avenue • New York 17, N.Y.

CHICAGO • CINCINNATI • DETROIT • PHILADELPHIA • PROVIDENCE • SAN FRANCISCO
IN CANADA: McARTHUR CHEMICAL CO., LTD. • MONTREAL AND TORONTO

MATERIALS

**Low temp flexibility
imparted to products
by plasticizers . . .**

also are low in volatility at high temperature

Plasticizers impart improved flexibility at reduced temperatures and are very low in volatility at elevated temperatures. This means that plastic articles containing plasticizers will remain flexible and handle easily under cold conditions, will also retain their strength when subjected to higher temperatures.

Plasticizers are NL-F22, a normal phthalate-ester of the semi-polymeric type; NL-F32, mixed alkyl adipate; and NL-F33, an alkyl adipate ester complex.

(Plasticizers NL-F22, 32, and 33 are products of National Lead Company, Dept. CP, 111 Broadway, New York 6, N.Y. . . . or for more information check CP 2946 on form which is located opposite last page.)

**Offers lauryl alcohols
of 95% C₁₂-C₁₄ . . .**

a broader cut is also available

Uses: Major uses are as intermediates for surface-active agents and as foam and emulsion stabilizers.

Features: Products are available in both "narrow" and broader cuts.

Description: Siponol L2 contains 95% C₁₂-C₁₄ alcohols. Siponol L5, a broader cut, is also available.

(Lauryl alcohol is a product of American Alcolac Corp., Dept. CP, 3440 Fairfield Rd., Baltimore 26, Md. . . . or for more information check CP 2947 on form opposite last page.)



For more information on product at left, specify CP 2948 . . . see information request blank opposite last page.

**Easily-formed impervious vinyl sheet
resists chemicals, is non-toxic,
can be permanently printed . . .**

packaging applications seen for this import

Uses: Unplasticized vinyl sheet is designed for chemical and pharmaceutical packaging applications, electrical insulation, laminations, and decorative uses.

Features: Sheeting is plasticizer-free, physiologically unobjectionable, and non-toxic. It has excellent forming properties and can be welded, bonded, and laminated. Odorless and tasteless, it is impermeable to gases, liquids, oils, and moisture. It has high chemical stability and is practically non-flammable. Operating temperatures are relatively high.

There are no migration problems. Printing by letter-press, gravure, or screen process gives a permanent scratch-free surface that will not pick. No lacquers or protective coating is used, nor is surface preparation necessary.

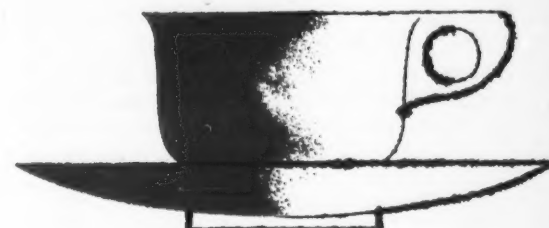
Description: The hard, unplasticized vinyl sheeting comes in 15 thicknesses ranging from 0.0012 to 0.020 inch, and transparent to opaque, colored and colorless. It is manufactured on special calenders and finished by a thermal post treatment. Approximate physical and electrical properties are shown in table:

Tensile strength (Type G, longitudinal, psi)	8500-17,000
Elongation at break (Type G, longitudinal, %)	20-50
Modulus of elasticity (psi)	280,000
Flexural strength (psi)	14,200
Compressive strength (psi)	11,300
Hardness (psi)	14,000
Thermal stability (Martens, °C)	65-70
Sp heat (kcal/kg/°C)	0.24
Shrinkage (15' @ 212°F, %)	
Type UG	2-5
Type G	40
Operating temp (°C)	122-140
Sp gr	1.38
Internal and surface electrical resistances (megohms)	10 ¹²
Dielectric constant (1000 kc)	3.4
Loss factor (tg δ @ 1000 kc)	0.015
Water absorption (mg/100 cm ² after 7 days @ 68°F)	<20
Water vapor transmission rate (65% against 0% RH, gm/sq M/24 hr)	
Foil thickness (mm)	rate
0.04	4.5
0.10	1.8
0.20	1.0
0.30	0.8

(Genotherm sheet is a product of Anorgana G.M.B.H. of Gendorf, Germany, and is distributed in USA by David S. Greenfield, Dept. CP, 1489 Plimpton Ave., New York 52, N.Y. . . . or for more information check CP 2949 on form opposite last page.)

for plastics . . . chemicals

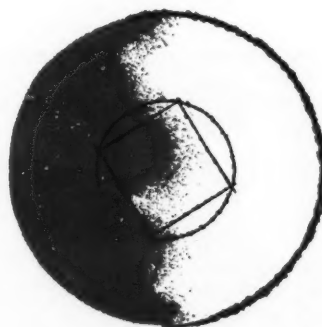
**are
our
cup
of
tea**



MATHIESON FORMALDEHYDE

A product of exceptional quality important to the manufacture of phenolic, urea and melamine resins. Shipped in four grades—37% inhibited, 37%, 45%, and 50% low methanol—in tank cars and tank trucks from Morgantown, W. Va.

MATHIESON HEXAMINE



As a chemical intermediate, Mathieson Hexamine (hexamethylenetetramine) provides a convenient water-free source of formaldehyde and tertiary amines. Useful in resin manufacture. Shipped in multiwall paper bags and fibre drums from Morgantown, W. Va.

Are you concerned with the manufacture of plastics or the purchase of ingredient chemicals? The name Mathieson assures products of purity and uniformity to meet the most critical requirements. To check our production against your specifications, write or call today.



MATHIESON CHEMICALS
OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

3623

INORGANIC CHEMICALS: Ammonia • Bicarbonate of Soda • Carbon Dioxide • Caustic Soda • Chlorine • Caustic Potash • Hydrazine and Derivatives
Hypochlorite Products • Nitrate of Soda • Nitric Acid • Soda Ash • Sodium Chlorite Products • Sulphate of Alumina • Sulphur (Processed) • Sulphuric Acid
ORGANIC CHEMICALS: Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Glycol Ether Solvents • Ethylene Dichloride • Dichloroethylene • Formaldehyde
Methanol • Sodium Methylate • Hexamine • Ethylene Diamine • Polyamines • Ethanolamines • Trichlorophenol • Trichlorobenzene

When inquiring check CP 2950 opposite last page

**Combine high reactivity, high solvency
with moderately low boiling point
in trimethyl phosphite . . .**

intermediate, specialty solvent uses seen

Uses: Several applications that are now being considered are as a chemical intermediate in preparation of phosphatic insecticides and dialkyl phosphonates; additive to oils and inks; and as a specialty solvent. There are many other potential uses.

Features: Product combines the properties of high reactivity, high solvency, moderately low boiling point, and reasonable toxicity.

Description: Trimethyl phosphite, $(\text{CH}_3\text{O})_3\text{P}$, is supplied as a colorless liquid. Physical properties of the pure compound are shown in table:

Bp ($^{\circ}\text{C}$)	108-108.5
Sp gr (20 $^{\circ}$ /4 $^{\circ}\text{C}$)	1.046
Index of refraction (n_D^{25})	1.4056
Flash and fire points (COC, $^{\circ}\text{F}$)	100
Viscosity (centistokes)	
@ 77 $^{\circ}\text{F}$	0.58
@ 210 $^{\circ}\text{F}$	0.32
Pour point ($^{\circ}\text{F}$)	-75
Toxicity (single oral dose on rats, LD ₅₀ in mg/kg)	2000

The compound is insoluble in water, but reacts with it. It is soluble in hexane, acetone, benzene, ethyl alcohol, ether, CCl_4 , kerosene, and mineral oil.

(Trimethyl phosphite is a product of Chemicals Div., Virginia-Carolina Chemical Corp., Dept. CP, 401 E. Main St., Richmond 8, Va. . . or for more information check CP 2951 on form opposite last page.)

**Produce efficient emulsifying
systems under corrosive,
high-temp conditions . . .**

these monobasic carboxyl acids are derived from chlorotrifluoroethylene

Uses: Indicated uses for the acids and their derivatives include promoters for two-phase reactions, additives for metal treating baths, insecticidal dispersants, gelling agents for printing inks and lubricating greases, rubber accelerators, antioxidants and stabilizers, and as chemical intermediates for making plasticizers, rust inhibitors, special purpose lubricants, damping fluids, and hydraulic oils.

Features: Compounds will produce efficient emulsifying systems under highly corrosive, high-temp conditions. As surface-active agents, they have high thermal stability (up to 450 $^{\circ}\text{F}$), excellent resistance to strong acids and oxidants, selective reactivity of a carboxylic acid, surface activity in a highly acidic, basic, or oxidizing

PRODUCTION PROBLEMS? COST PROBLEMS?

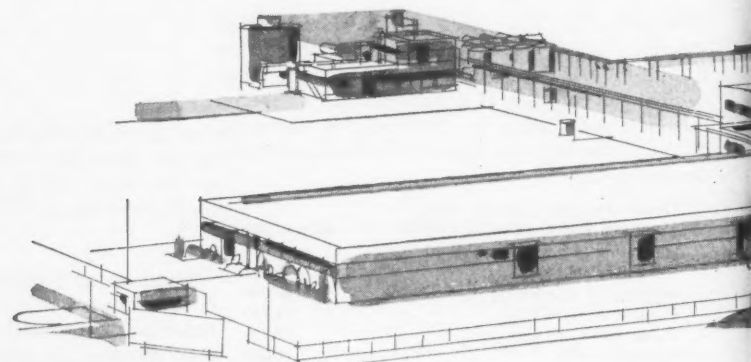
**Armour cationics solved both in these two widely
diverse fields. New applications are constantly being
developed and added to the hundreds already known.
Perhaps these unique chemicals can help you.**

It will benefit you to include Armour cationics in your testing program whether your business is rubber processing, mineral recovery, paper manufacturing, petroleum refining or whether you make germicides, paints, plastics or almost any item at all. Extremely low concentrations of these highly active chemicals are increasing efficiency and profits for industries in at least a thousand different ways. Today,

there are more than 100 different Armour cationics. One of them may be the chemical you've been looking for.

Let Armour cationics specialists help speed your search. The two examples shown here are typical of the 1000 and more successful applications for Armour cationics. Our research people will recommend cationics which have delivered similar outstanding results in your field.

**ARMOUR—world's largest
producer of cationic chemicals**



**Armour cationics reduce water flood
corrosion up to 99.5% and give
complete control of bacteria—for
as low as 0.7 mill per barrel of water**

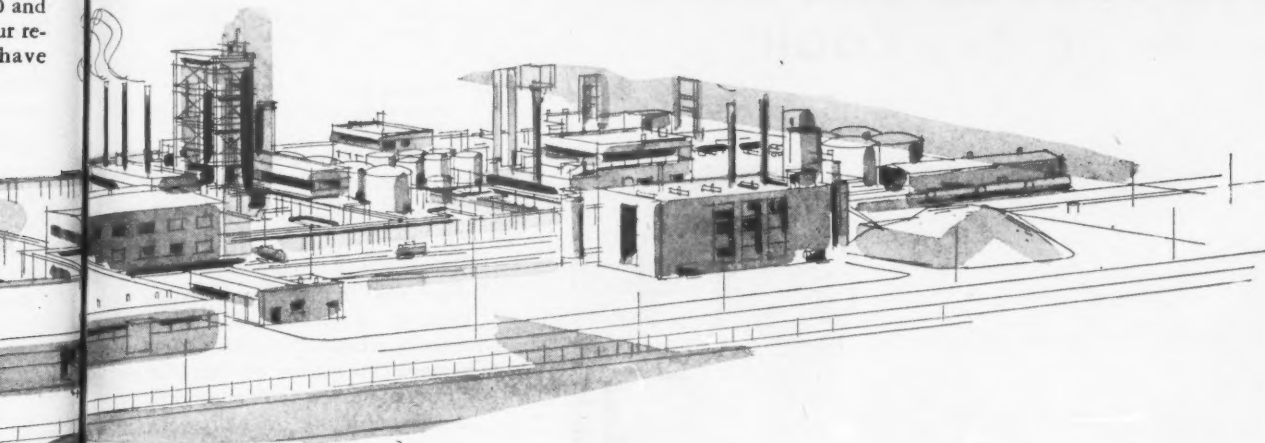
In secondary oil recovery, water is injected into the formations to force out the oil. Corrosion products—bacteria, and algae—often plug up water injection wells. As a result, less water can be injected and less oil is recovered. Now, engineers from over 124 water flood systems in eight states report that Armour cationics, such as the Arquads®, Armac®C and Duomeen®C give up to 99.5% corrosion protection. Concentrations as low as 6 ppm. also achieve complete control of algae and bacteria. Costs run from 0.7 to 2.1 mills per barrel of water. No expensive equipment needed!

Armour makes over 100 cationics. Corrosion and bacteria control are only two of over 1000 applications. Effective at low concentrations, they are increasing production and profits for a broad range of American industries.

Storage and field tests prove Armour herbicide emulsifiers give stability and flash dispersion—for as little as 7¢ per gallon of concentrate

An effective emulsifier for herbicides must impart high stability during storage of the emulsifiable concentrate. After more than 1½ years of warehouse storage, concentrates containing Armour emulsifiers show no sign of separation or loss of emulsifying properties. Emulsifiability and stability are equally excellent with both soft and hard waters. And when added to water these concentrates give *flash dispersion!* Herbicides prepared with Armour cationics can also be diluted with fuel oil without the formation of sludge. And as little as 2% of an Armour emulsifier is required, compared with 5% for other emulsifiers. Armour cationics cut emulsifier costs to as low as 7¢ per gallon of concentrate!

Whether you are looking for a low cost herbicide emulsifier or working on cost reduction in some other application, you may very well find the answer in Armour's wide range of cationic chemicals. They are reducing costs in more than 1000 known applications.



This brief list of proved applications will suggest many areas where testing of Armour cationics may prove profitable for you.

Anti-statics • Emulsifiers • Asphalt Additives.
Textile Softeners • Corrosion inhibitors in water systems
Corrosion inhibitors in oil systems • Pigment wetting
Bactericides • Hard rubber mold release agents
Algaecides • Buffing compound additives
Vinyl mold release agents • Latex foam sensitizers
Flotation reagents • Nitrile rubber plasticizers and softeners

For information on any of the hundreds of proved uses for Armour cationics—and for current data on possible new areas of application—fill in the coupon at the right.

MAIL THIS COUPON TODAY!

Please send me information on Armour cationics for the following applications:

Name _____

Firm _____

Address _____

City _____ State _____



ARMOUR CHEMICAL DIVISION

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1355 West 31st Street, Chicago 9, Illinois

CP1

When inquiring check CP 2952 opposite last page

MATERIALS

medium, low vapor pressure, and high density. They are miscible with most organics.

Description: This series of perhalogenated, monobasic carboxyl acids is derived from chlorotrifluoroethylene, and undergoes reactions involv-

PHYSICAL PROPERTIES OF KEL-F ACIDS

	683	8114
Formula	Cl-ICF ₂ -CFCl ₂ -CF ₂ -COOH	Cl-ICF ₂ -CFCl ₂ -CF ₂ -COOH
Physical state	colorless liquid	colorless liquid
Odor	sharp	sharp
Formula weight	363	480
Boiling Point, °C.	232	280
Freezing Point, °C.	ca. -40	ca. -17
Density, 20°C., g./ml.	1.833	1.894
Viscosity, 20°C., cs.	125	1619
Surface Tension, 25°C., dynes/cm.	27.6	28.7
Vapor Pressure, mm. Hg./°C.	3.4/100 39.4/150	0.4/100 6.8/150
Constants for Vapor Pressure Equation ¹		
A	9.5258	9.5534
B	3356	3690
Index of Refraction, n _D ²⁰	1.389	1.397
Dielectric Constant, 25°C.	3.65	3.39
Heat of Vaporization, k cal./mole	15.4	16.9
Treuten Ratio	30.5	30.6

¹ Log Pmm.Hg. = A - B/T²

ing the carboxyl group. Metallic salts, esters, acid halides, alcohols, amides, nitriles, and ketones have been prepared. Since the toxicity of these acids has not yet been fully determined, normal practices employed for concentrated H₂SO₄ must be considered in their use. Storage in glass or chemically resistant plastic containers is recommended.

(Kel-F® Acids No. 683 and 8114 are available in introductory quantities from Chemical Manufacturing Div., The M. W. Kellogg Co., a Sub. of Pullman Inc., Dept. CP, PO Box 469, Jersey City 3, N.J. . . . or for more information check CP 2953 on form opposite last page.)

Rubber-phenolic molding materials — evaluation and use

Design engineers and others interested in plastic parts should find this 32-page design file a convenient handbook for evaluation and use of manufacturer's rubber-phenolic molding materials. Booklet gives design advantages, comparative properties, design suggestions, and 25 case histories of applications.

"Design File, Rubber-Phenolics" is issued by Chemical and Metallurgical Div., General Electric Co., Dept. CP, One Plastics Ave., Pittsfield, Mass. Specify CP 2954 opposite last page.

PLANT:
PRODUCTION:
PROCESS:
PRODUCT:

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OF *National Aniline*

Only once in a lifetime does this happy combination of plant, process and product advantages occur. National Aniline's new production of Adipic Acid at Hopewell, Virginia is exceptional in every respect. It represents a wholly-new, major integrated source of a much-needed, versatile dicarboxylic acid for the rubber, plastics, plasticizer, synthetic lubricant and chemical industries.

Hopewell is now producing important tonnage of ADIPIC ACID. Its output can be expanded as fast as the need arises. We welcome inquiries from present and prospective makers of adipates, adipic polyesters and polyurethanes for samples, technical data, price and delivery quotations.

SEND FOR TECHNICAL BULLETIN I-12

This comprehensive 8-page technical bulletin on National Adipic Acid gives physical and chemical properties; principal reactions to the carboxyl and alpha methylene groups; solubility curve, and suggested uses with copious literature references. Your copy will be sent without obligation on request.

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Boston Providence Philadelphia Chicago San Francisco
Portland, Ore. Greensboro Charlotte Richmond Atlanta
Los Angeles Columbus, Ga. New Orleans Chattanooga Toronto



New from the ground up!
Allied-Chemical integrated!
Efficient and continuous!
Sets an industry standard!

ADIPIC ACID



MATERIALS

Crease resistance, hand, and appearance of rayon fabrics enhanced

Uses: In finishing viscose rayon and viscose-blended fabrics by the Avcoset textile-finishing formula of American Viscose Corp.

Features: Textile finisher can chemically finish these textiles and provide a number of favorable characteristics. In addition to shrinkage control, chlorine-bleach resistance, and durability of both to washing, durable crease resistance, hand, and retention of appearance are improved.

Description: Prym finishing resins are designed for use in the Avcoset formula. Typical formula to impart a firm hand is:

	Per cent
Avcoset WS	7.5
Formaldehyde (37%)	10
Prym N	5
Diglycolic acid	3

Prym CR is substituted to give a soft hand. Both are used for shirt-making hand.

When properly processed and dried, treated viscose and viscose-blended fabrics have shown shrinkage control of 1% or less through 25 washes at the boil, crease angles of 130° or higher, and loss of tensile by chlorine degradation of less than 5%.

(Prym N and CR resins are products of Sun Chemical Corp., Dept. CP, 10th St. at 44th Ave., Long Island City, N.Y. . . . or check CP 2955 opposite last page.)

Color bulletin revised

Revision of Stan-Tone MBS Color bulletin giving changes in master-batch color data has been issued by Harwick Standard Chemical Co., Dept. CP, 60 S. Seiberling St., Akron 5, Ohio. Specify CP 2956 opp. last page.

For more information on product at left, specify CP 2957 . . . see information request blank opposite last page.

Handbook on boron carbide and elemental boron

The importance of the ($n\alpha$) reaction of the boron isotope B^{10} to nuclear science and engineering has resulted in extensive tests and studies of numerous stable boron-rich materials. This 16-page monograph collects available data and outlines manufacturer's capabilities with respect to boron, boron carbide, boron nitride, and certain metal borides, including the mixed borides developed in company's laboratories. These materials have relatively good resistance to radiation damage, as well as high mp, good chemical stability, and high strength. Therefore, they will be helpful to many reactor design programs. The text is accompanied by numerous graphs, tables, and illustrations. A bibliography contains twenty-six entries.

"Handbook on Boron Carbide and Elemental Boron" is issued by Norton Company, Dept. CP, 1, New Bond St., Worcester 6, Mass. When inquiring check CP 2958 opposite last page.

Antioxidant in plasticizer improves heat aging in vinyl compounds

Uses: As a plasticizer for vinyl compounds designed for high-temp use, such as vinyl electrical insulation compounds.

Features: Plasticizers are compounded with an anti-oxidant to improve heat aging properties of the compound.

Description: Designated Flexol plasticizers 810x (a higher alcohol phthalate) and 10-10x (a di-decyl phthalate), they are offered at the price of the corresponding plasticizers without an anti-oxidant.

(Plasticizers for vinyls are products of Carbide and Carbon Chemicals Co., A Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check CP 2959 on form opposite last page.)

Commercial-scale lithium iodide for slow neutron scintillation detection and measurement

Increasing demand for a very efficient detector of slow neutrons makes mass production of Europium-activated lithium iodide crystals for slow neutron scintillation detection and measurement feasible.

(LiI is a product of National Radiac, Inc., Dept. CP, 479 Washington St., Newark, N.J. . . . or for more information check CP 2960 opposite last page.)



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FOR your special convenience, Pittsburgh Phthalic Anhydride now comes to you in new "Quick-Open" bags. They open with just a flick of the wrist . . . fast . . . easy . . . straight . . . and without spillage. Quick-Open bags guarantee you full measure, save you time and labor.

And remember, with this new plus value in handling ease, you still enjoy (1) Reliable supplies from an integrated plant; (2) Assured purity and low color value, and (3) 24-hour deliveries to most points when you specify Pittsburgh Phthalic Anhydride. Let us show you how these important benefits add up to better, more economical production in your plant. Call for a Pittsburgh man today! In Pittsburgh, call ATLantic 1-2290, in New York, LOnacre 4-0550 and in Cleveland, CHerry 1-2170.



COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

When inquiring check CP 2961 opposite last page



What are your catalyst carrier applications?

Norton engineered and prescribed carriers offer you important processing advantages

What do you need? An inert, high alumina carrier for fixed bed oxidation reactions — such as those involved in the manufacture of phthalic anhydride, maleic anhydride and ethylene oxide?

An inert, low density carrier for use as a space filler or tower packing?

Norton ALUNDUM* fused alpha alumina carriers are proving highly successful in such processes. Containing 77% to 89% alumina, they are outstanding for chemical stability and resistance to abrasion and erosion — and their low density is a valuable quality in packing and filling applications.

ALUNDUM carriers are commercially available in the form of spheres, rings and pellets. Also available in experimental quantities are carriers made of MAGNORITE*, CRYSTOLON*, Fused Stabilized Zirconia and Kyanite materials.

ALUNDUM Spherical Carriers

provide uniform beds in catalytic converters, reducing channeling and pressure drop to a minimum. Medium porosity spheres (40%-44%) have a network of open pores on the outside surface only. These are specifically recommended for applications where the carrier is coated with a catalyst. High porosity spheres (45%-49%) have an internal as well as external network of pores, and are suitable for applications where the carrier is impregnated with a catalyst.

Other Norton Refractories

for chemical processing include porous mediums, laboratory ware, ALUNDUM, MAGNORITE, CRYSTOLON, and Fused Stabilized Zirconia shapes. All are engineered and prescribed to give you the best possible R — the most effective combination of physical

characteristics plus thermal, chemical and electrical properties. For details call in your Norton Refractories Engineer, or write, mentioning your specific requirements to NORTON COMPANY, 560 New Bond St., Worcester 6, Mass. Canadian Representative: A. P. Green Fire Brick Co., Ltd., Toronto, Canada.

NORTON

REFRACTORIES

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*Making better products...
to make your products better*

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

MATERIALS

Stabilizer gives printability, heat-sealing characteristics to clear vinyl films . . .

it works fine in formulations that contain heat sensitive pigments

Uses: Compound is a stabilizer for rigid and flexible vinyl formulations and vinyl plastisol compounds.

Features: Stabilizer has a very low odor and has excellent compatibility. In normal concentrations, clear and transparent vinyl films can be obtained. These have good printability and good heat sealing characteristics.

Material is an excellent heat stabilizer in compounds where heat-sensitive pigments are used to give light colored shades to vinyl films. It will also stabilize vinyl formulations containing high percentages of phosphate-type plasticizers.

Description: Polymeric thio organo-tin stabilizer has these typical physical properties:

Color (G-H)	3-6
Sp gr (@ 25°C)	1.03-1.04
Viscosity (Gardner @ 25°C)	A-1 to A-3
Refractive index (@ 25°C)	1.48-1.49

Supplied as a clear liquid, stabilizer contains sulfur chemically combined in its molecule. It cross-stains when placed in contact with vinyl film containing lead and other heavy metal stabilizers. It also should be borne in mind that the stabilizer is free of any fatty acid and therefore imparts no inherent lubricity to a formulation. Stearic acid or calcium stearant is recommended for this purpose.

(Advastab 50-671 is a product of Advance Solvents & Chemical Corp., Dept. CP, 245 Fifth Ave., New York 16, N.Y. Check CP 2963 opp. last page.)

Check patents before making diisocyanate resins!

Readers of CHEMICAL PROCESSING's article on polyester resin/toluene diisocyanate foam-in-place plastics (in the September 1955 issue, page 46) should investigate the patent situation and possible infringement liability before engaging in manufacturing procedures involving information and formulations given in the article.

A number of patents on the use of diisocyanates have been assigned to Lockheed Aircraft Corp., Monsanto Chemical Co., E. I. du Pont de Nemours & Co. (Inc.), and others.

Information in any article appearing in CHEMICAL PROCESSING must never be construed to imply the nonexistence of any relevant patents nor construe a permission, inducement, or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

When inquiring check CP 2962 opposite last page

**Micronized hydrocortisone acetate
for suspensions, ointments**

Uses: Offers the ethical pharmaceutical manufacturer a product suited for his needs in intraparticular injectibles and ophthalmic and topical ointments.

Features: The product has been tailor-made for aqueous suspensions and for ointments where particle size is important in blending process.

Description: Hydrocortisone acetate is available as a white, micro-crystalline powder.

(Micronized hydrocortisone acetate is a product of Chas. Pfizer & Co., Dept. CP, 630 Flushing Ave., Brooklyn 6, N.Y. . . . or for more information check CP 2964 on form opposite last page.)

**Properties and performance data
on extender pigment for paints**

Properties of Wollastonite, a natural calcium metasilicate, are given in four-page folder. Performance data in exterior house paints and PVA emulsion paints are given.

"Wollastonite Extender Pigment for Paints" is issued by Minerals & Chemicals Div., Godfrey L. Cabot, Inc., Dept. CP, 77 Franklin St., Boston 10, Mass. Specify CP 2965 opposite last page.



"Well, at least you learned about alcohol
at the chemical show . . ."

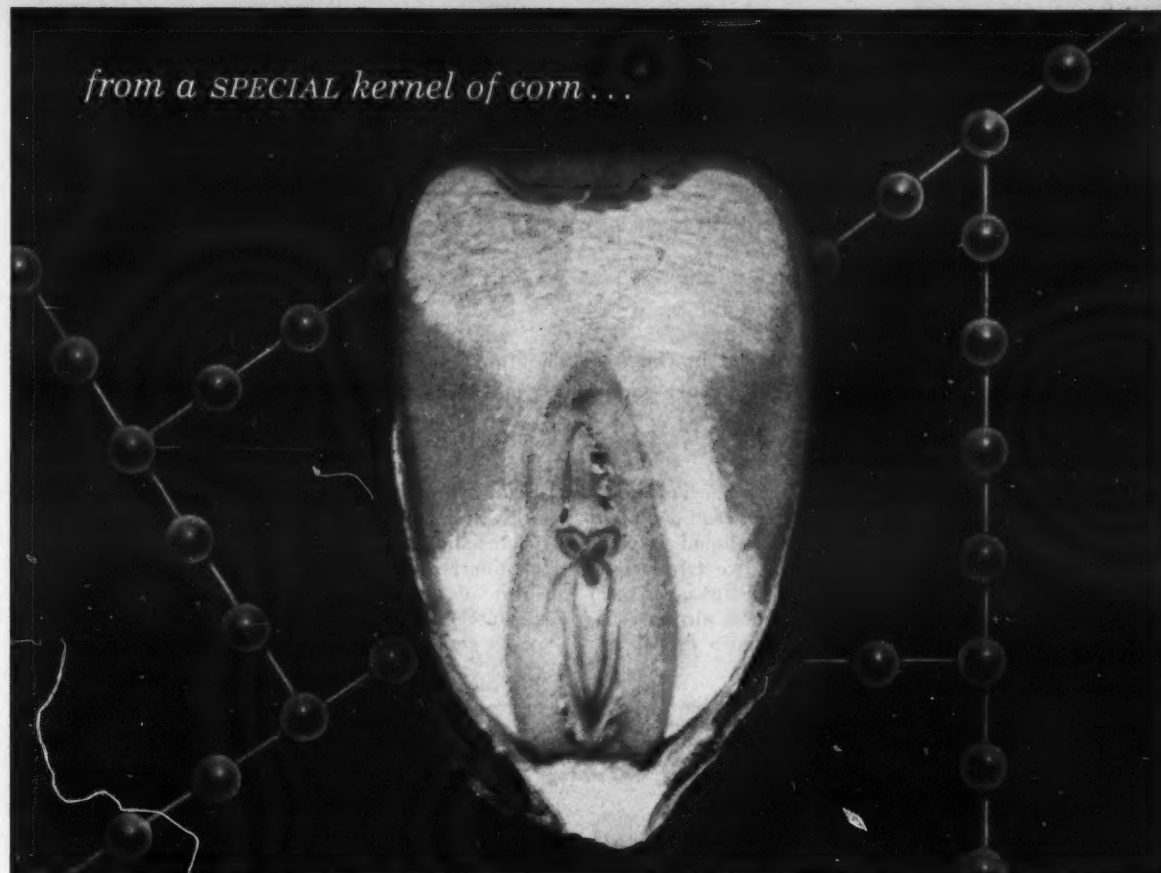


Photo courtesy of Corn Industries Research Foundation, Inc.

STARCH with highly branched molecules

—that effectively resists retrogradation or "set back" after cooking. This is AMIOCA, National's highly branched, 100% amylopectin starch*. It forms strong, clear, continuous films and exhibits excellent resistance to jelling.

A few of AMIOCA'S practical uses include:

- Paper Sizing and Finishing—for calender stack and size press application to improve gloss ink printability, surface strength, wax holdout and as a presize for protective coatings.
- Frozen Food Thickening—also for pie fillings, soups, etc., where clarity and a minimum of retrogradation are essential.
- Textile Sizing, Printing and Finishing.
- Adhesive or Bonding Applications.
- Extender for Synthetic Resins—where cold stability is desirable.
- Replacement for Expensive Natural and Synthetic Thickeners.

Where can you use AMIOCA?

*AMIOCA (amylopectin) is one of the two molecular components of ordinary corn starch. The other component known as amylose—which is linear, is absent in the AMIOCA starch. AMIOCA is produced from a unique hybrid corn grown especially for National, and refined in our Indianapolis plant.

National

STARCH PRODUCTS INC.

270 Madison Avenue, New York 16 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

When inquiring check CP 2966 opposite last page

Six easy-to-handle derivatives

have acrolein's high reactivity

Second chapter in The Acrolein Story* is being written by introduction of more compounds and increased applications

1,5-Pentanediol — Suggested uses include as an intermediate for polyester resins and as plasticizer. The high boiling viscous liquid is colorless and has a mild odor. The two terminal hydroxyl groups impart solubility in polar compounds such as water, the low-mw alcohols, and acetone. The hydrocarbon chain gives partial solubility in aromatics and aliphatics.

Both hydroxyl groups are easily esterified with acids and anhydrides. Polyesters made from 1,5-pentanediol can be used in urethane foams and elastomers. They are also used in glass fiber reinforcing resins, and in magnet and wire enamels. Because of its longer chain length, this diol imparts greater flexibility to final products. Resins made from it should be more resistant to oxida-

tion and thermal degradation than those based on diols containing ether linkages.

Many esters made from 1,5-pentanediol have been suggested as plasticizers to give better tensile strength, improved flexibility, and lower volatility to vinyl polymers. Other esters may be possible as components in sizes for textile fibers, such as cotton, rayon, and wool.

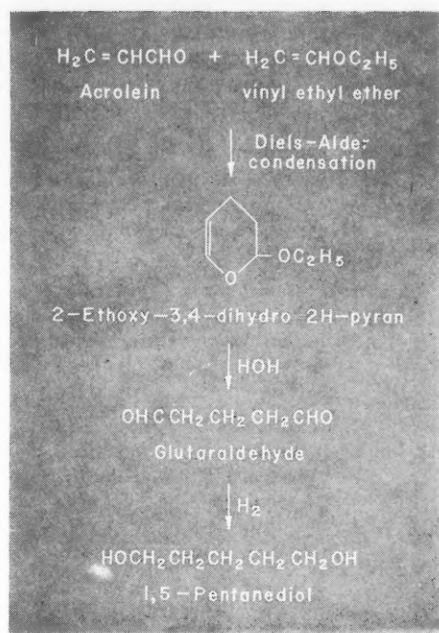
Other uses for derivatives of 1,5-pentanediol include lubricants for high temp applications, in emulsion breakers, in brake fluids, in insect repellent formulations. They are also suggested as nylon solvent components.

Glutaraldehyde — When oxidized, this dialdehyde forms glutaric acid; when reduced, 1,5-pentanediol. The two aldehyde groups react to insolubilize proteins. By varying conditions, the films of many proteins can be insolubilized to any desired degree. The compound imparts water resistance to polyvinyl acetate latex emulsions and poly-

*See CHEMICAL PROCESSING, May 1955, page 46

TYPICAL PHYSICAL PROPERTIES

	1,5-Pentanediol	Glutaraldehyde	2,2,3-Trichloropropionaldehyde	2-Chlorallyl-dine Diacetate	Tetraethoxy-pentane	3,9-Divinyl-spirobi (m-dioxane)
Specific gravity (20/20°C)	0.9921	1.074	1.489	1.2105	0.918	
Coefficient of expansion (per °C @ 20°C)	0.00059	0.00067	0.00099	0.00098		
Boiling point (°C @ pressure indicated)	242.5 (760mm) 165 (50mm)	101 (760mm)	145 (760mm) 68 (50mm) 33 (10mm)	212.1 (760mm) 130 (50mm) 96 (10mm)	95 (2mm)	110 (3mm)
Vapor pressure (mm @ 20°C)	<0.01	17	5	0.03		
Azeotrope with water (@ 760mm)	None					
Freezing point (°C)	-15.6	-6.3	Sets to a glass below -100	Sets to a glass below -60		
Melting point (°C)			<100			43
Solubility in water (wt % @ 20°C)	∞	Complete		0.41		
Solubility water in (wt % @ 20°C)	∞	Complete		0.36		
Solubility in organic solvents (wt % @ 25°C)						
Acetone	∞		∞	∞		
Benzene	0.6		∞	∞		
Ethyl ether	6.0		∞	∞		
Heptane	0.6		∞	9.2		
Methanol	∞		∞	∞		
CCl ₄	<0.01		∞	∞		
Viscosity (cps @ 20°C)	127.8		29	7.7		
Refractive index (n _D ²⁰)	1.4489		1.4798	1.4408	1.4180 (@ 30°)	
Average wt (lb per gal @ 20°C)		8.90				
Molecular Weight			161.43	192.60		200.23



One branch of the acrolein derivative family tree

vinyl alcohol films and can be used to make textile fabrics shrink- and crease-resistant, and to give papers dimensional stability and water resistance.

Polyhydric compounds such as PVA emulsion, polyvinyl alcohol, and "Cellosize" hydroxyethyl cellulose can be cross-linked by using the compound. Because of the long chain length, fibers treated with this dialdehyde should have greater flexibility than those treated with formaldehyde or glyoxal.

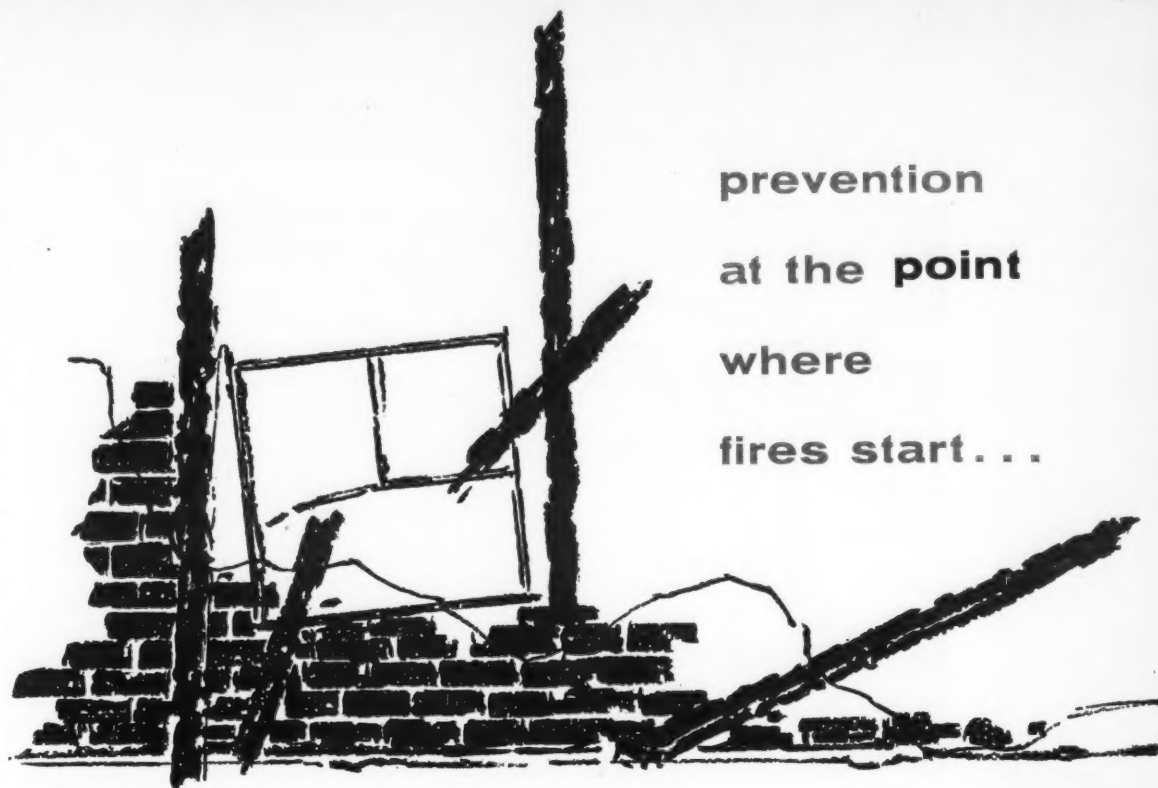
The compound is a very effective bactericide for control of sulfate-reducing bacteria, such as found in secondary recovery of oil by water flooding.

The two aldehyde groups undergo usual reactions of such groups; acetals, amines, and vinyl ether adducts are some of the types of compounds which can be derived from this intermediate. Reaction with ammonia gives a pure grade of piperidine.

Glutaraldehyde comes as a stable 25% aqueous solution having a mild odor and light color.

2,2,3-Trichloropropionaldehyde — This water-white liquid, with chemical formula $\text{ClCH}_2\text{CCl}_2\text{CHO}$, undergoes characteristic reactions of aldehydes. It is suggested as an intermediate for insecticides, pharmaceuticals, biologically-active materials and other applications where such chlorinated compounds may be of interest. Availability: research quantities.

2-Chlorallylidine diacetate — A copolymer of
(Please turn to page 43)



prevention
at the point
where
fires start...

Fire-resistant Celanese* Cellulubes*

Synthetic lubricants and power transfer fluids
now available in 6 controlled viscosities

Celanese Cellulubes are fire-resistant synthetic oils, designed to provide protection against fire hazards and explosion inherent in many industrial operations.

As air cylinder lubricants in compressed air systems, Cellulubes prevent the formation of excessive carbon deposits—No. 1 source of compressor fires and explosions. They are excellent lubricants—highly stable, non-corrosive, non-foaming.

As the hydraulic fluid in diecasting and similar critical operations, Cellulubes reduce the ever-present danger from uncontrollable fires due to line breaks or other failures. Chemical compounds that contain no additives, Cellulubes' physical properties are exceptionally stable under continuous duty.

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With the expansion of the Cellulube series to 6 controlled viscosities: 90, 150, 220, 300, 550, and 1000 (S.U.S. @ 100°F.), the way is open to replace flammable fluids in many hazardous applications. If you would like to evaluate Cellulube in your own opera-

tion, use coupon below to order working samples and complete use data. Celanese Corporation of America, Chemical Division, Dept. 591-A, 180 Madison Avenue, New York 16, N. Y.

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Please send me working sample and technical bulletin on Cellulube for air compressor service _____ for hydraulic systems _____.
Send technical representative _____.

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Company _____
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City _____ Zone _____ State _____

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When inquiring check CP 2967 opposite last page

FAMOUS LIGHTHOUSES OF AMERICA



BARNEGAT LIGHT is located on Island Beach at the south side of the entrance to Barnegat Inlet, New Jersey. For more than a century its beacon has been a familiar course-marker to all craft traveling the steamer lanes off the Jersey coast. The first lighthouse, built in 1835, was leveled by a pounding Atlantic. The present tower, 161 feet high and made of brick, was completed in 1858, 900 feet south of the original structure. The tower itself is now owned by the State of New Jersey but the light is maintained by the U. S. Coast Guard.

Lighting Ways to Progress and steady growth in the field of electrochemicals is the Niagara Alkali Company—a pioneer in the development, production and use of these important products. Rely on Niagara for uniformly high quality in Nialk® Liquid Chlorine, Nialk Caustic Potash, Nialk Carbonate of Potash, Nialk Paradichlorobenzene, Nialk Caustic Soda, Nialk TRICHLORethylene, Niagathal® (Tetrachloro Phthalic Anhydride).

NIAGARA ALKALI COMPANY

60 East 42nd Street

New York 17, N. Y.

MATERIALS

Instant positive action given by mold release compound . . .

effective on both thermoplastic and thermosetting materials

Uses: As a mold release in phenolic and reinforced polyester molding, lamination, vacuum forming, compression, injection, and shell molding.

Features: Compound gives instant, positive release by creating a continuous parting film that resists tendency of plastics to adhere to molds.

Description: Product has as a base a group of complex high polymers. It can be sprayed, brushed, or wiped on mold surfaces. Surfaces must be clean and free of organic coatings or films. Mold release will not interfere with plating or painting of casted materials.

(Mold-Wiz is a product of Axel Plastics Research Laboratories, Dept. CP, 110 W. 34th St., New York 1, N.Y. . . . or for more information check CP 2968 on form opposite last page.)

Enzyme converting of starches

Technical service bulletin of 12 pages discusses enzyme converting of starches for paper industry. Discussion includes starch types and characteristics, enzymes, pH effect, and costs.

Special attention is given to converting procedure and application of starch in paper mill operations. Formulations for clay and color coating are given.

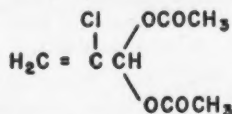
"Enzyme Converting of Starches for the Paper Industry" is issued by Stein, Hall & Co., Inc., Dept. CP, 285 Madison Ave., New York 17, N. Y. Specify CP 2969 opposite last page.

For more information on product at left, specify CP 2970 . . . see information request blank opposite last page.

ACROLEIN DERIVATIVES

(Continued from page 41)

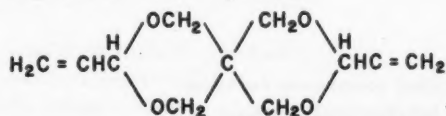
this compound with vinyl chloride is easier to fabricate by molding, milling or extrusion than are many other polymers and copolymers of vinyl chloride. It also has a higher heat distortion point than that of the vinyl chloride



and vinyl acetate copolymers. Its rapid rate of copolymerization with vinyl chloride eliminates the need for removal of unreacted monomer.

1,1,5,5-Tetraethoxypentane — Compound is a chemical intermediate and a convenient source of more anhydrous glutaraldehyde *in situ* by hydrolysis. This permits the use of a more concentrated form of the aldehyde.

3,9-Divinylspirobi (m-dioxane) — Both double bonds react with most compounds that contain active hydrogens, such as acids, amines, and alcohols. Thus it should be of great interest as a reactive monomer for cross-linking and thermosetting resins, such as phenolics



and materials such as polyglycols and polyamines. It should also be a good cross-linking agent for cellulosic and proteinaceous materials. Reactions of the spiro compound with various polyols are reported in the literature.

(Acrolein derivatives are products of Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation, Dept. CP, 30 East 42nd Street, New York 17, N. Y. . . . or for more information check CP 2971 on form opposite last page.)

Reviews industrial applications of molybdenum chemicals

The first comprehensive review of industrial applications of molybdenum chemicals is available in 28-page monograph. Seven papers presented at ACS's Div. of Industrial and Engineering Chemistry describe the element and its use in catalysts, inorganic pigments, organic pigments, metal coatings, alloys for the chemical processing industries, and use in soil nutrients.

Bul Ch-15 is issued by Climax Molybdenum Co., Dept. CP, 500 Fifth Ave., New York 36, N.Y. When inquiring specify CP 2972 on form opposite last page.

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SOLUBILITY

Excellent balance of properties makes Shell Chemical hexylene glycol a superior coupling agent, penetrant, humectant, dispersant, wetting agent, high-boiling solvent . . . with a cost advantage, too.

Among its many other useful properties, hexylene glycol has the lowest specific gravity of all glycols. This fact can be a source of savings when you buy by the pound and sell by the gallon.

But no matter which of its properties you may have use for, there is no better source of high-purity hexylene glycol than Shell Chemical. Conveniently located bulk depots

assure prompt shipment. And multi-solvent shipments via compartment tank cars or trucks can result in substantial savings to you.

Your Shell Chemical representative will gladly discuss your solvent requirements with you at your convenience. Write for your copy of Technical Booklet SC:50-1, Hexylene Glycol.

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When inquiring check CP 2973 opposite last page

LITHIUM... Key Chemical in the Future of Defense



Lithium is nothing new. The element was discovered nearly 140 years ago, but lay dormant. As late as World War II, only two significant applications utilizing Lithium existed; both were military: Lithium Hydride as a hydrogen carrier in air-sea rescue kits; Lithium Hydroxide for multi-purpose greases.

Today, Lithium serves America's defenses on the ground, in the air, and over and under the sea. You will find Lithium used in low temperature dry cell batteries, in the deicing of parked aircraft, in the air conditioning of naval vessels, in low temperature, all-purpose greases to mention but a few.

The future of Lithium in war, or in defense of peace, is infinite—no one can gauge it. Propellants, new high temperature alloys, cermets, chemical processes—all hold promise of great developments to come. You are invited to explore this treasure house of the present—and the future—with us.

... trends ahead in industrial applications for Lithium

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Pittsburgh • Chicago • CHEMICAL PLANTS: St. Louis Park, Minnesota • Bessemer City, North Carolina • RESEARCH LABORATORY: St. Louis Park, Minnesota

When inquiring check CP 2974 opposite last page

MATERIALS

**Industrial paint finishes
based on resin duo
are quick drying . . .**

they impart good color and gloss retention, dependable shelf life, durability

As coating resins in industrial paint formulations, these impart excellent color and gloss retention, dependable shelf life, and durability.

Coating Resin 3801 is a styrene-alkyd copolymer supplied as a viscous solution on xylol. Air drying or baking finishes based on this resin exhibit very rapid drying or curing speeds. Pigmentation with full colors or white and brilliant "hammer-tone" finishes with uniform pattern are obtainable.

Coating Resin 3309, when used as the amine resin component of baking enamels, imparts improved resistance to water, humidity, grease, and stains. Enamels based on it can achieve these benefits at curtailed baking schedules of approximately 20 min @ 280°F.

(Plaskon coating resins are products of Barrett Division, Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N. Y. . . . or for more information check CP 2975 opposite last page.)

**Exhibit coenzyme function
in biochemical systems . . .**

three 5'-mononucleotides of guanosine come as sodium salts of high purity

Series of compounds exhibit coenzyme function in many biochemical systems. They are of interest in research on metabolism of carbohydrates, fats, proteins and nucleic acids, muscle contraction, and photosynthesis. Three 5'-mononucleotides of guanosine are spectroscopically homogeneous and are available as soluble sodium salts of high purity.

(Coenzymes are products of Pabst Laboratories, Div. of Pabst Brewing Co., Dept. CP, 1037 W. McKinley Ave., Milwaukee 3, Wis. . . . or for more information check CP 2976 on form opposite last page.)

**Experimental test results
on gasoline antioxidant**

Comprehensive data from years of research on anti-oxidants to inhibit gum-formation in automotive and aircraft engines are described in 24-page bulletin. The additive, 2,6-di-tertiary-butyl-*p*-cresol (DBPC) is described.

"DBPC and Impruvol 33" is issued by Chemical Division, Koppers Co., Inc., Dept. CP, 1301 Koppers Bldg., Pittsburgh 19, Pa. When inquiring check CP 2977 on form opposite last page.

Advantages of several plasticizers combined in general purpose compound . . .

particularly adapted for PVC compounds, it is first of a series

Uses: Plasticizer for polyvinyl chloride compounds.

Features: Compound combines advantages of several classes of plasticizers into one general-purpose material. It contains both polar and non-polar groups.

Description: Compound is a primary plasticizer with high solvating properties. A clear, oily liquid, it cannot be appropriately placed in existing classifications such as monomeric or polymeric since it is of a new generic type. Compound is first of a series.

(Esterflex B-1 is a product of Swift and Co., Industrial Oil Dept., Dept. CP, 1800-165th St., Hammond, Ind. . . or for more information check CP 2978 on form opposite last page.)

No odor or toxicity problems when you replace H_2S with thioacetamide . . .

now available commercially for use in qualitative and quantitative analysis

Uses: Replaces hydrogen sulfide as a reagent in qualitative and quantitative analysis.

Features: Compound performs the function of gaseous hydrogen sulfide, has no odor, and is non-toxic.

Description: Reagent thioacetamide has individual lot analyses: Assay, 98.5%; melting point, 112-114°C; residue upon ignition, 0.01%. No special equipment is required for its use. Precipitates are coarsely crystalline, dense, and easily filterable. The rate of hydrolysis can be controlled by changing temperature of thioacetamide solution. (Thioacetamide is a product of Fisher Scientific Co., Dept. CP, 717 Forbes St., Pittsburgh, Pa. . . or for more information check CP 2979 on form opposite last page.)

Easy determination of solubility of hydrocarbons in water with nomograph on page 164

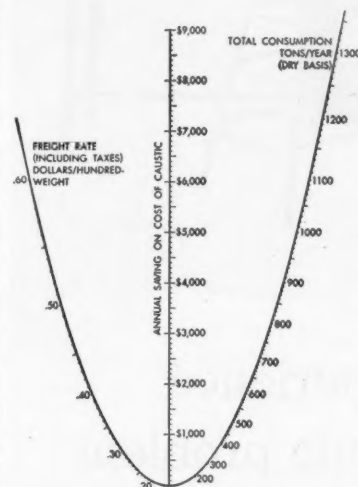
BRIEFS

for buyers of

Caustic Soda
Paradichlorobenzene
Muriatic Acid

50% to 73% — some save, some don't

Like to settle once and for all whether you can save by switching from 50% to 73% liquid caustic soda? Simply draw a line on this nomograph.



Start at your freight rate and draw to your annual consumption in tons, dry basis. Your approximate savings on freight will appear where you intersect the center line.

From this figure, subtract annual depreciation for dilution equipment. (We'll be glad to advise you on cost of this equipment.)

If you still show a saving, it would be wise to consider the big switch seriously.

For more facts on the economics of 50% and 73% caustic, check the coupon for a copy of our pocket-size *Caustic Soda Buyer's Guide*. And for specific technical advice centered on your requirements, just phone or write the nearest Hooker sales office.

The great moth hunt

Some of our forward-looking customers are busily getting set for those spring days when the housewives of the country decide to put away their woollens and furs until next winter.

To satisfy that market, you can offer a product unsurpassed in whiteness and dryness. That product is PARADI®.

We're almost unbelievably fussy about paradichlorobenzene. We make it in seven different sizes. Each size has its advantages, which you can learn by reading our Bulletin 454.

We manage to get PARADI so pure that it sublimates completely in use—leaving no residue, not even an odor!

This persistence seems to pay off. Users, who frequently sample the field, tell us PARADI is tops for repackaging, and the sparkling crystals make a firm, dry, non-oozing block or pellet of exceptional whiteness and brilliance.

If you're preparing to wage commercial war on moths, why not look into the convenience of PARADI's seven sizes?

To get Bulletin 454, check the coupon. For 1-lb. samples of PARADI, write us on your business letterhead.

How to arrive at a happy HCl solution

For help in figuring your muriatic acid needs, send the coupon for our technical data sheet on this product.

It tells at a glance the amount of muriatic acid you need to make up various volumes of different Baumé solutions.

The same data sheet gives advice on the safe handling of muriatic acid, and lists the characteristics of Hooker muriatic.

"Hooker White" is a grade of muriatic acid that's probably one of the purest you can buy in volume anywhere. It's free of arsenic, contains no more than .003% sulfates, .0001% iron. Like Hooker's standard grade, "Hooker White" is shipped in 13-gallon glass carboys and rubber-lined tank cars. 18", 20", and 22" Baumé.

For a sample of either "Hooker White" or standard, write us on your business letterhead.

Check items you'd like to receive:

☐ **Caustic Soda Buyer's Guide.** Lists advantages of 50% and 73% solutions; comparative costs; capacities of tank cars and other containers; useful shipping information.

☐ **Bulletin No. 454.** Helpful information on PARADI: for repackagers and processors.

Keep your file up-to-date with technical data sheets on these Hooker chemicals:

☐ Caustic soda (standard grade)
☐ Caustic soda (rayon grade)
☐ Paradi (Hooker paradichlorobenzene)

☐ Muriatic acid
Clip and mail with your name, title, and address.

**HOOKEE
CHEMICALS**

From the Salt of the Earth

HOOKEE ELECTROCHEMICAL COMPANY

15 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.
NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

When inquiring check CP 2980 opposite last page



We can apply 40 years experience to help solve your Sulfur Dioxide problem

The chemist in the background (above) dates us—August of 1915 to be exact. This was the month and year we shipped our first cylinder of liquid sulfur dioxide.

A good deal of our energies during the past 40 years have been devoted to perfecting a quality-control system for the manufacture of sulfur dioxide. Today, we are supplying our customers a near 100 percent

pure grade (99.9%) of this chemical.

Equally important, to our way of thinking (our customers' too), has been the growth of our service facilities. Over the years we have been privileged to serve and instruct a host of industries in the economical application of sulfur dioxide. This background of diversified experience is available for your use.

Special problems involving sulfur

dioxide, those relating to new or unusual uses, receive special attention in our research laboratories. So if your chemical process includes bleaching, acidifying, purifying, fumigating, reducing, or preserving, investigate the advantages of using Ansul liquid sulfur dioxide. Write ANSUL CHEMICAL COMPANY, Dept. C-34 Industrial Chemicals Division, Marinette, Wisconsin.



When inquiring check CP 2981 opposite last page

MATERIALS

Obtain permanent flexibility of film from vinyl acetate copolymer using internal plasticizers . . .

yields good low-temperature film formation
in presence of high pigment loads

Uses: As an emulsion paint vehicle for good water-resistance, and compounding properties.

Features: Internally-plasticized, vinyl acetate copolymer emulsion provides permanently flexible paint films that will not become brittle due to loss of plasticizer on aging.

Description: Vehicle is a nonionic, fine-particle dispersion copolymer of vinyl acetate and an unsaturated plasticizing monomer. It yields good low temperature film formation in presence of high pigment loads. Emulsion contains 50% solids, has a viscosity of 300-700 cps, and weighs 9.0 lb/gal.

(Polyco 678 is a product of Borden Co., Chemical Div., Dept. CP, 350 Madison Ave., New York 17, N.Y. . . . or for more information check CP 2982 on form opposite last page.)

High gloss, printing finish attained on boxboard by acrylic binder . . .

coated readily with many types of equipment

Uses: Binder for pigmented coatings for paper was developed to produce high-quality coatings for folding boxboard.

Features: It has outstanding gloss, excellent printing properties, and good mechanical and chemical stability. High gloss and finish are attained on machine calenders without supercalendering. It can be applied readily with many types of coating equipment.

Binder has a low viscosity, so that coatings with higher-than-usual solids content can be formulated and applied easily. Coatings dry rapidly, have good water resistance, and are flexible.

Description: The acrylic emulsion has a 46% solids content, and can be blended with other binders to reduce coating costs or to obtain working properties similar to those of protein-bound coatings. Some specifications for the binder are:

Weight per gallon (lb)	8.7
Particle size (microns)	<1
pH	6.0-6.5

It is also stable to most pigments, except zinc oxide and clays.

(Rhoplex B-15 is a product of Resinous Products Div., Rohm & Haas Co., Washington Square, Philadelphia 5, Pa. . . . or for more information check CP 2983 on form opposite last page.)

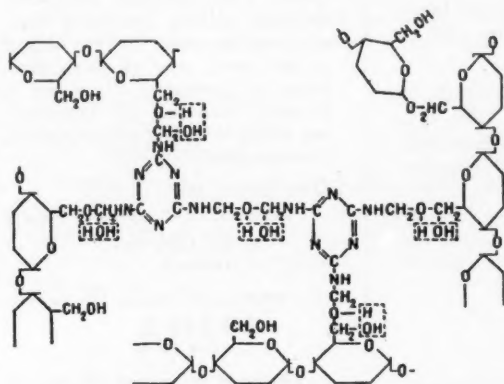
**In resin finishes, gives fullness —
in crease-resistant finishes,
it builds hand . . .**

starch ether is cold-water soluble, solutions are freeze-thaw stable, of constant viscosity

Uses: To contribute greater fullness to resin finishes, whether finish is classified as firm, crisp, or soft. It is an excellent hand builder in crease-resistant finishes.

Features: Starch derivative is cold-water soluble and produces a freeze-thaw stable solution with no variation in viscosity. It can be used with glyoxal, formaldehyde, urea formaldehyde, and melamine formaldehyde resins. Both embossed and friction calendered finishes are much improved by its addition. Since it is easily insolubilized by the above resins, it is of value to laundry-resistant, durable, and permanent finishes.

Description: Starch ether has a number of free hydroxyl groups which are quite reactive. Ac-



Condensation product of starch ether and melamine formaldehyde

companying chemical representation shows its condensation product with melamine formaldehyde resin. The compound is produced under patents of the W.A. Scholten Company of The Netherlands.

Films of the compound are perfectly transparent and have no odor when dried. Films won't develop an odor in stored fabrics to which they have been applied. Starch ether is compatible with starches, gums, thermoplastic resins, and some durable water repellents. Recent investigations have shown that compound polymerized with formaldehyde and glyoxal when an acid catalyst is used.

(Solvitose HDF is a product of Morningstar, Nicol, Inc., Dept. CP, 630 W. 51st St., New York 19, N.Y. . . . or for more information check CP 2984 on convenient Reader Service slip which is located opposite last page.)

THE SWITCH IS TO... DAVISON SILICA GEL FOR DRYING NATURAL GAS

Actual use tests have proven to many that Davison Silica Gel is the efficient, economical way to dry natural gas. Davison Silica Gel gives you a high capacity for moisture even at elevated temperatures (110-120°F.). It is economical to use because it requires fewer reactivations and gives longer life due to its resistance to fouling and attrition. Davison Silica Gel dries a wide variety of gas feeds to extremely low dew points. It is one of the most efficient adsorbents known for hydrocarbon recovery. Investigate Davison Silica Gel for drying natural gas. Your Davison Field Service Engineer will be glad to give you all the details or write for complete technical data on drying of natural gas contained in Davison Bulletin No. 201.

Progress Through Chemistry

DAVISON CHEMICAL COMPANY
Division of W. R. Grace & Co.
Baltimore 3, Maryland

Sales Offices: Baltimore, Md. • Chicago, Ill. • Columbus, Ohio • Houston, Texas • New York, N. Y.
Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates, Phosphate Rock, Silica Gels and Silicofluorides. Sole producers of DAVCO® Granulated Fertilizers.

When inquiring check CP 2985 opposite last page

QO

FURFURAL USE RESEARCH

*is a sound
investment*

for new
and
improved
applications,

more
efficient
manufacturing
methods



The Quaker Oats Company

CHEMICALS DEPT.

Frequent success has resulted from investment in use research based on QO furfural. The return on the investment has been derived through creation of new products, as well as through better methods for processing existing products.

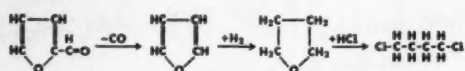
There are well over fifty commercial uses for QO furfural, with the list still growing at a healthy rate.

Some of the principal useful properties of furfural are:

POLAR SOLVENT AND EXTRACTION—Furfural is useful in separating mixtures by solvent extraction or extractive distillation. Excellent selectivity, good phase separation, stability of the solvent, as well as ease and completeness of recovery are important features.

CHEMICAL REACTIONS OF THE ALDEHYDE GROUP—Furfural is an economical source of aldehyde for the preparation of phenolic resins. The furan ring exerts a modifying effect on the resultant resins and improves flow and deep draw properties, chemical resistance and wetting.

REACTIONS OF THE RING—Many cyclic and open chain compounds are readily and economically obtainable from furfural. Here is an example of one reaction route that has opened up an entire new field.



REACTIVE SOLVENT—Furfural is not only a powerful solvent but in some cases actually may be reacted with the solute, thus becoming a part of the final product. A good example of this is with phenolic resins. This property is valuable to manufacturers of abrasive wheels, brake linings and other products where wetting, solubility, and minimum production of volatiles are important.

A request on your letterhead for a sample and Bulletin 204 "Current Uses of Furfural" will receive prompt attention, and may be the start of a sound investment for you.

336F The Merchandise Mart, Chicago 54, Illinois
Room 536F, 120 Wall St., New York 5, N. Y.
Room 436F, P. O. Box 4376, Portland 8, Oregon
In the United Kingdom: Imperial Chemical Industries, Ltd., Billingham, England
In Europe: Quaker Oats-Graanproducten N. V., Rotterdam, The Netherlands
Quaker Oats (France) S. A., 3, Rue Pillet-Will, Paris IX, France
In Australia: Swift & Company, Pty., Ltd., Sydney
In Japan: F. Kanematsu & Co., Ltd., Tokyo

MATERIALS

Very thin films of anti-static agent and UV-light absorber for plastics are highly efficient

Uses: As an ultra-violet light absorber and anti-static agent for plastics.

Features: Very thin films are highly efficient in filtering out UV light. Films are highly transparent to visible light. Material also removes static electricity and static-caused dust.

Description: Called AST Concentrate 1001, compound in a film 1/1000 inch thick has these per cent light transmittance at wavelengths:

Wavelengths (mμ)					
380	390	400	410	440	480
Transmittance (%)					
0.01	0.1	0.2	2.5	77	95

Data measured in Beckman UV spectrophotometer

A layer 0.000006 inch thick filters out 43% of the UV light at 310 mμ. Film may be applied by spraying, wiping, or dipping finished plastics. For destaticizing, compound can be diluted with water as low as 1:10. Compound has a pleasant faint odor, is approximately neutral in acidity, and is non-flammable.

(Light stabilizer and destaticizer is a product of Merix Chemical Co., Dept. CP, 1021 E. 55th St., Chicago 15, Ill. . . . or for more information check CP 2987 on form which is located opposite last page.)

Offers permanent film flexibility, excellent compounding stability . . .

copolymer emulsion was developed primarily for making polyvinyl acetate paints

Uses: Emulsion was developed primarily for use in manufacture of polyvinyl acetate paints.

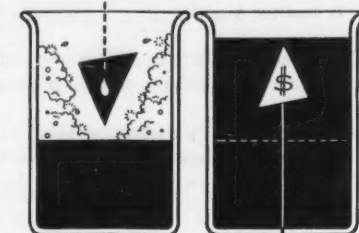
Features: For those who prefer to work with a copolymer emulsion, it offers permanent film flexibility and excellent compounding stability. It is compatible with the usual pigments and additives.

Description: The aqueous dispersion of a polyvinyl acetate copolymer has a minimum total solids content of 55%. Particles are anionic in nature and average less than one micron in size. Other characteristics are:

Emulsion viscosity (cps, Brookfield #3 spindle, 30 rpm @ 25°C)	900-1300
Residual monomer content (%)	<1.0
pH	4.0-5.0

(Gelva® Emulsion TS-70 is a product of Shawinigan Resins Corp., Dept. CP, 644 Monsanto St., Springfield 2, Mass. . . . or for more information check CP 2988 on form opposite last page.)

DOWN goes foam



UP goes production with Dow Corning Silicone Defoamers

Dow Corning Antifoam A* Compound and Antifoam A emulsions are the most efficient and versatile foam killers ever developed. Thousands of successful applications prove they increase productive capacity, reduce processing time, eliminate the waste and fire hazard of boil-overs. And all three, Antifoam A Compound¹—Antifoam A Emulsion—Antifoam AF Emulsion², are effective at low concentrations. For example:

One Ounce of

. . . Antifoam A Compound kills foam in
 δ 35,000 lb
 Vitamin B₂

. . . Antifoam A Emulsion kills foam in
 δ 1,245 lb
 textile sizing

. . . Antifoam AF Emulsion kills foam in
 δ 2,075 lb
 chocolate syrup

¹ Permissible in food processing at concentrations up to 10 ppm.
² Permissible in food processing at concentrations up to 32 ppm.

free sample

Test these versatile silicone defoamers at our expense.

SEND COUPON TODAY!

DOW CORNING SILICONES		Dow Corning Corporation Midland, Mich., Dept. 3201	
Please send me:			
<input type="checkbox"/>	Booklet on Silicone Defoamers; FREE		
<input type="checkbox"/>	sample of Antifoam A Compound		
<input type="checkbox"/>	Antifoam A or AF Emulsion;		
NAME _____			
COMPANY _____			
ADDRESS _____			
CITY _____	ZONE _____	STATE _____	

© T M DOW CORNING

When inquiring check CP 2989
opposite last page

CHEMICAL PROCESSING

When inquiring check CP 2986 opposite last page

Gives superior waterproofing to corrugated paperboard at high production rates . . .

modified starch permits adjustment of degree of waterproofing by alteration of formula

Uses: As an adhesive in high-speed manufacture of waterproof corrugated paperboard.

Features: Due to adhesive's alkaline nature, production speeds equal to those obtained with conventional starch corrugating paste can be maintained. Waterproof characteristics are developed immediately. Aging is not necessary, even with "hard-to-stick" mediums. Degree of waterproofness is adjustable simply by alteration of the formula. Adhesive is completely compatible with domestic starch paste, has long pot life, and low net cost.

Description: Called "Staybind" waterproof corrugating starch No. 5030, product was developed in conjunction with Koppers Company's Chemical Division. Chemically, it is a starch-resorcinol mixture which forms a waterproof bond when combined with formaldehyde on the corrugating machine.

No waterproofing qualities are lost on storage of a formulated adhesive for 2 or 3 days at 110°-115°F under agitation.

("Staybind" waterproof corrugating starch No. 5030 is a product of A. E. Staley Manufacturing Company, Dept. CP, 22nd St., Decatur, Ill. . . . or for more information check CP 2990 on form opposite last page.)

Improved cold check resistance in nitrocellulose formulations, also greater permanence . . .

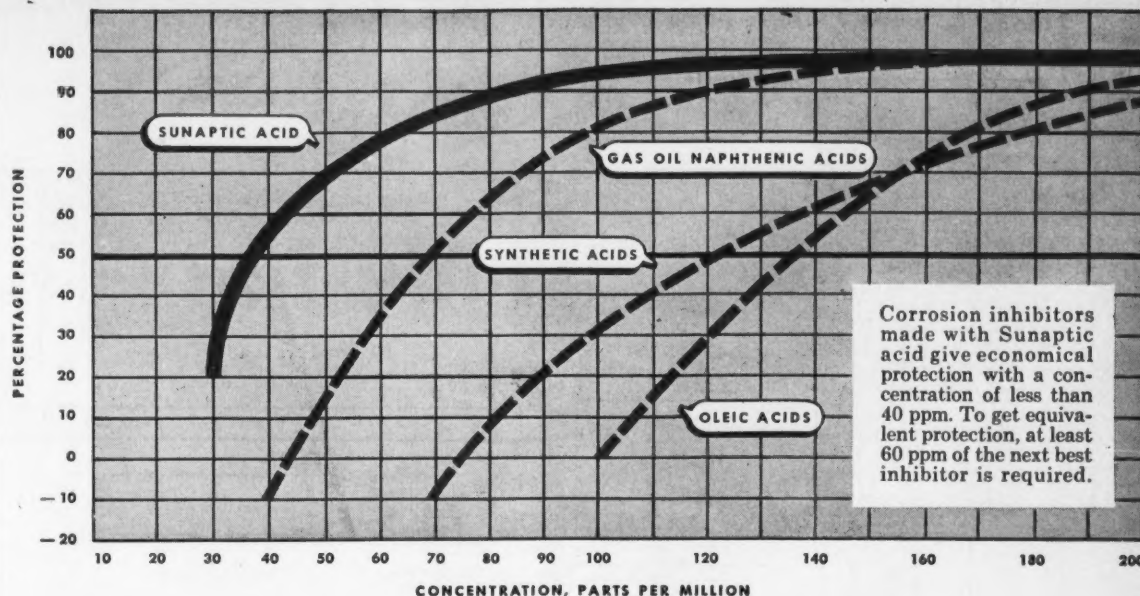
plasticizer gives better heat sealability

Uses: As a plasticizer in nitrocellulose formulations such as used to coat wood, paper, metals, and cloth.

Features: Compound provides nitrocellulose lacquers with improved cold check resistance and greater permanence.

Description: Films incorporating plasticizer, chemically an octyl butyl phthalate, seal at a lower temperature than those using conventional compounds. Low temperature flexibility, print resistance, blocking resistance, exudation, and hardness are comparable to those obtained with other plasticizers. It is not compatible with polyvinyl acetate.

(Plasticizer 84 is a product of Eastman Chemical Products Inc., Dept. CP, Kingsport, Tenn. . . . or check CP 2991 opposite last page.)



UNIQUE SUNOCO PETROCHEMICAL INCREASES EFFICIENCY OF CORROSION INHIBITOR OVER 50%

High-molecular-weight Sunaptic acids replace fatty, naphthenic and synthetic acids

Corrosion of tubing and casing in oil wells and in crude oil pipelines is a major problem that can be minimized by corrosion inhibitors. Several promising corrosion inhibitors combine tallow diamine with fatty, naphthenic or synthetic acids. The results of tests with these inhibitors were considered excellent until an inhibitor containing Sunaptic acid was tested. The Sunaptic acid inhibitor, which costs about the same per gallon, proved to be 50% more efficient than the next best inhibitor. This increased efficiency can save thousands of dollars a year in one oil field alone.

If you are making a product with fatty, rosin, synthetic, or ordinary naphthenic acids, there's a good chance Sunaptic acids can help you improve your product. These unique high-molecular-weight acids have many unusual properties: no olefinic unsaturation, high resistance to oxidative rancidity, low freezing or pour points, and a higher hydrocarbon solubility than ordinary fatty and rosin acids.

Sun Oil Company has two Technical Bulletins de-

scribing both the properties of Sunaptic acids and many possible uses for them. To get copies of these Bulletins, see your Sun representative, or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. CP-1.

Sun Oil Company produces many other petrochemicals. These include:

BENZENE, TOLUENE, MIXED XYLENES
PROPYLENE TRIMER AND TETRAMER
SULFONATE WS (water soluble sulfonates)
PDO-40 (polymerized drying oil)

The list of Sunoco Petrochemicals is growing rapidly . . . several new Sunoco Petrochemicals will be introduced shortly. If you have a problem that may be solved by a new type of petrochemical, we'll be glad to discuss it with you.

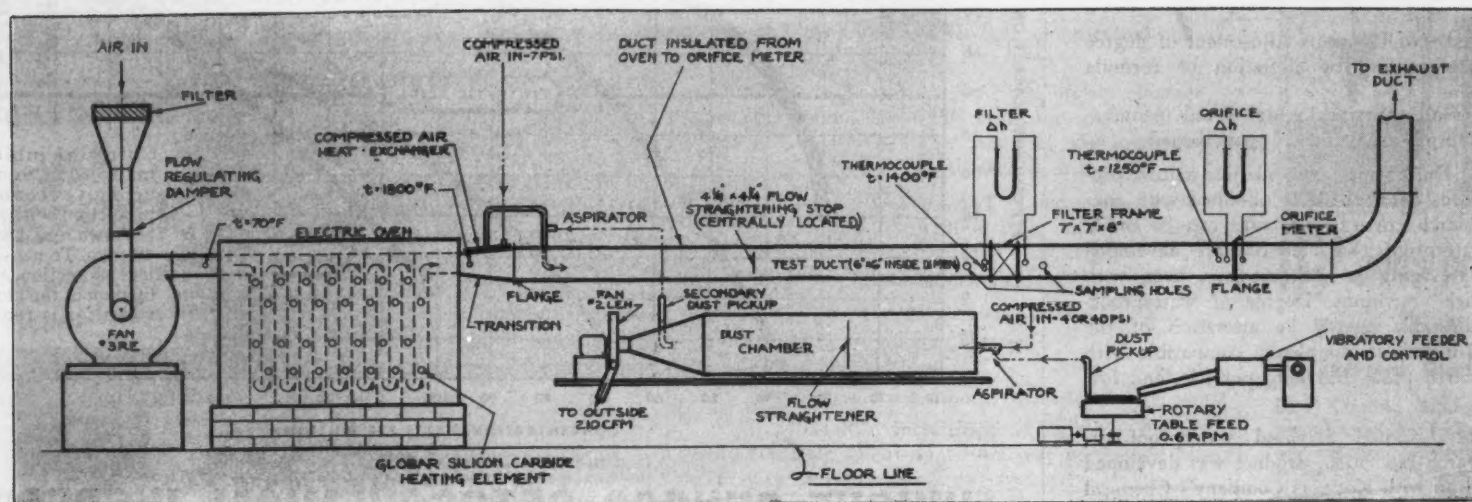
INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY, PHILA. 3, PA.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

When inquiring check CP 2992 opposite last page





Test apparatus used for removing radioactive particles from hot exhaust gases

Ceramic fiber filter passes AEC test . . .

removes 99% of fine dust from 1400°F air

Material also shows promise for use in air pollution control, other industrial applications

Tests conducted for the US Atomic Energy Commission have shown that filters made with Fiberfrax ceramic fibers can remove 99 percent of fine radioactive particles from hot exhaust gases. Made by processes similar to those used for mineral wool or staple glass fibers, the white fibrous material is similar in appearance to spun glass, and withstands temperatures up to 2000°F for prolonged periods. Product shows no tendency to melt or sinter even at 2500°F. Material does, however, gradually change from an amorphous glassy structure to crystalline at exposures over 2000°F, the change proceeding faster at higher temperatures.

For the particular aerosol specified by the AEC, top results were obtained with a filter composed of three individual fiber sizes — 20, 10, and 8 microns in diameter. When tested at 1400°F, at a gas flow of 400 fpm and dust loading of approximately 10 grains per 1000 standard cu ft, dust removal efficiency was greater than 99 percent by weight. Air

flow resistance was about five inches of water.

Based on 99 percent dust collection efficiency, the particle size efficiency of the graded fiber filter was:

Size range, microns	Removal efficiency, % by weight
0 - 1	78.4
1 - 2	95.4
2 - 5	99.4
> 5	99.9

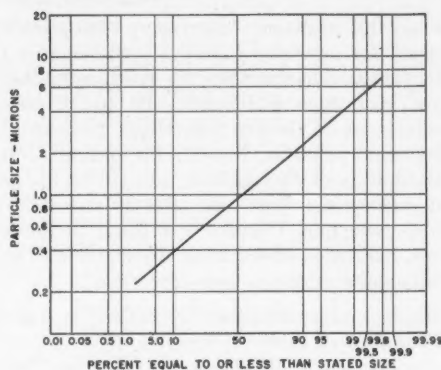
The fibers were arranged as follows, with the coarsest fibers upstream and the finest downstream.

Fiber diameter, microns	Packing Density, lb per cu ft	Depth of fibers, inches
20	1.0	5
10	1.1	1
8	1.1	1/8

Visual examination of the filter layers at the con-



White fibrous material is similar in appearance to spun glass, withstands temperatures up to 2000°F



Particle size distribution by weight, of dust penetrating graded fiber filter

clusion of the tests indicated that the mass of dust was concentrated within the two coarsest fiber layers. Only slight staining of the final fine fiber layer occurred. The fact that the dust was well distributed throughout the fiber mass was favorable for long service life and slow resistance rise with dust deposition.

Twenty-five hundred grains of dust per cu ft of filter were deposited in the graded fiber filter during the course of the tests without appreciable resistance increase. Most important, from the standpoint of long service life: dust did not accumulate at the surface of the filter or at the interfaces between layers of different fiber sizes and form a high-resistance dust layer.

Test dust used in all efficiency experiments was Baker's technical grade black copper oxide having a sp gr of 6.4. Dust cloud entering filter had a mass median diameter of 8.5 microns. Sixty-nine percent by weight of the suspension was greater than five microns and 97.5 percent was greater than one micron.

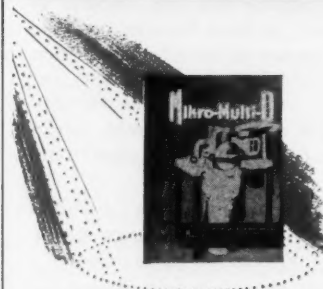
Performance of the filter in these tests has spurred investigation as to its application in air pollution control, other industrial problems involving hot gases. One special application using Fiberfrax paper has an efficiency of 99.9 plus percent for 0.3 microns DOP smoke.

(Fiberfrax fiber was developed by Carborundum Company, Dept. CP, Niagara Falls, New York . . . or for more information about manufacturer's product reader may simply check CP 2993 on convenient Reader Service slip which is located opposite last page.)

(Filters used in the tests were designed by Buffalo Forge Company, Dept. CP, Buffalo, New York . . . or for more information about manufacturer's product reader may simply check CP 2993A on convenient Reader Service slip which is located opposite last page.)

Presenting the Mikro-Multi-D

A New Multi-Grind Pulverizer Designed to Insure Product Purity



SEND FOR—your copy of
new MIKRO-Multi-D Bulletin
and Test Grinding Data Sheet.

Mikro-D

The new MIKRO-Multi-D Pulverizer has been especially designed for any processing system in which purity of the product is of prime importance.

This new unit, which provides precise particle control in the 4 to 20 mesh range, is light, yet durable. It is easily assembled and disassembled, permitting quick changes from one product to another with complete freedom from spoilage or contamination. It can also be readily adjusted for speedy changes in particle sizing.

Its ease of thorough cleaning and reassembly makes the MIKRO-Multi-D ideal as a utility unit for many industries, but particularly in the food and drug fields. A test on your own product in the MIKRO Laboratory may provide a solution to your grinding problems.

PULVERIZING MACHINERY DIVISION
METALS DISINTEGRATING COMPANY, INC.
60 CHATHAM ROAD
SUMMIT, NEW JERSEY

PULVERIZING • AIR CONVEYING • DUST COLLECTING EQUIPMENT

When inquiring check CP 2994 opposite last page

What it takes to make a 3000 Degree Refractory Concrete



Because of the widespread interest in the use of refractory castables, many furnace operators have asked us for the story behind the performance of B&W's unique refractory concrete, Kaocast.

Here are the answers to some of the most frequently asked questions:

Q. When you refer to Kaocast as a 3000 degree refractory castable, do you mean that its melting point is 3000° F?

A. No, this means that its service use limit is 3000° F; its melting point is 200 degrees higher.

Q. Just what does it take to make a 3000 degree refractory castable like B&W Kaocast?

A. Let's first define a few terms. Refractory castables are made with granular materials which are volume stable at high temperatures and which can undergo repeated heating and cooling cycles without disintegration. These materials, known as refractory calcines or grogs, are blended with suitable hydraulic binders. The initial strength of a refractory castable is thus developed in the same manner as that of ordinary concrete—that is, through the chemical action between water

and the binder. A strong *ceramic bond* is formed when the refractory castable is subjected to temperatures above the vitrification point.

Q. Then you have a grog, a binder and a method of putting them together. Which is most important?

A. You can't say that any one is most important. It's a combination of all three. Let's take them one at a time. Our grog consists primarily of the proper blend of kaolin and other alumina-silica materials. This ratio enables us to achieve a grog with minimum expansion and shrinkage, a high fusion point, and greater stability under load, at varying temperatures.

Q. And now, what about the binder?

A. There are a number of factors responsible for the success of the Kaocast binder. One is the compound Tricalcium Penta-aluminate (3 lime to 5 alumina). This formula produces the most refractory compound (highest melting point) that can be made from lime and alumina. Another is that by using the purest commercially available lime and alumina, the Kaocast binder is substantially free of iron and silica. Such traces of these that are present combine during the pre-

firing of the binder to produce stable compounds.

Q. Just how important is the manufacturing or "blending" of the grog and the binder?

A. If one factor could be singled out as "most important" it would be quality control.

Direct control over the fineness of materials, pre-firing temperatures, and other phases of manufacture is possible at B&W because both the grog and the binder are made and blended at B&W's Augusta Works—under B&W's direct control and supervision.

Q. These factors you've discussed must add up to some specific advantages of Kaocast. What are they?

A. B&W Kaocast has all the advantages of easy installation which are responsible for the widespread interest in refractory concretes, plus these exclusive features: It is the only 3000 degree refractory concrete with high resistance to spalling and low volume change throughout its operating range.

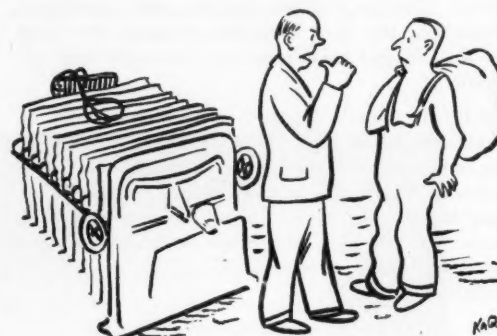
THE BABCOCK & WILCOX CO.
Refractories Division
General Offices:
161 East 42nd St., New York 17, N. Y.
Works: Augusta, Ga.

IDEAS

Periodical designed to improve supervisory efficiency

New monthly magazine, "Supervisory Management", is an aid for increasing supervising efficiency in all fields. Published by the American Management Association, each issue will contain 60 to 70 pages. Objectives are to sharpen supervisor's awareness of management problems, broaden his picture of the responsibilities of management, and aid in his personal development. First issue takes up such subjects as work sampling, grievance handling, production control, motivation of employees, the supervisor's role in community relations, and arbitration.

(Additional information may be obtained by writing C. W. McDowell, Director, Supervisory Development Services, American Management Association, Dept. CP, 1515 Broadway, Times Square, New York 36, New York.)



"I don't care if they are your Sunday pants,
take 'em out of the filter press!!"

GOT A CARTOON IDEA? . . .

. . . Ken Quetchenbach of Eastman Kodak did, and sent this one to us.

We're looking for cartoon ideas from readers in chemical and allied plants.

CHEMICAL PROCESSING will pay, on acceptance, \$10 for each completed cartoon (in black ink, ready to reproduce); and we'll pay \$5 for each accepted cartoon idea (without the drawing).

Only stipulations are that you be a CHEMICAL PROCESSING reader, working in the chemical processing industries . . . that the cartoon touch on some phase of industry . . . and that it's original.

Send your cartoons or ideas to:

Cartoon Editor
CHEMICAL PROCESSING
111 East Delaware Place
Chicago 11, Illinois

When inquiring check CP 2995 opposite last page

High-speed camera services available for research

High-speed photographic services are available to research groups through special department set up by camera manufacturer. Originally conceived for working out application problems, the facilities have been expanded to permit the accommodation of custom projects.

Fields of interest covered include fluid flow, flame study, acoustics, vibration analysis, ballistics, and high-velocity mechanical motions. Photographic studies can be made at framing rates up to 1.2 million per second and under conditions of either reflected light or schlieren illumination.

(High-speed photographic service is offered by Beckman & Whitley, Inc., Dept. CP, 960 San Carlos Ave., San Carlos, California.)

Guaranteed annual wage means tougher job for foremen . . .

will have to be skilled personnel technician, training director

Much has been written about the problems faced by management in working out methods to stabilize employment. When all is said and done, however, it's still the front-line supervisor who has to put all these ideas into practice.

The guaranteed annual wage means a big job coming up for the foreman. He will have to give attention to better utilization of man-hours. In order to do this, he must have a more realistic concept of what constitutes a fair day's work. The foreman will have to give greater attention to training. Workers will have to be taught

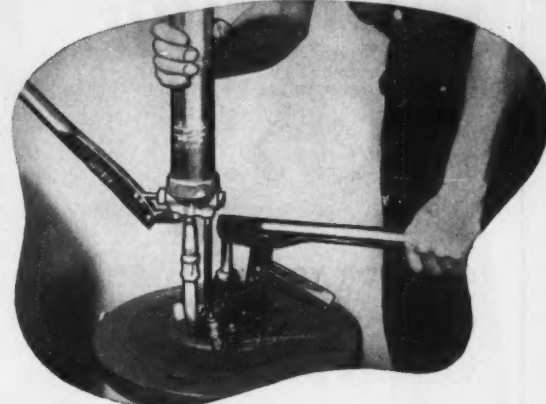
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For more information on product at right, specify CP 2996 . . . see information request blank opposite last page.



YOUR PRODUCTION GOES UP...
when you switch lubrication methods from

Backward to Forward!



ALEMITE HAND GUN WITH LOADER PUMP

reduces downtime...cuts man-hours
...saves right down the line!



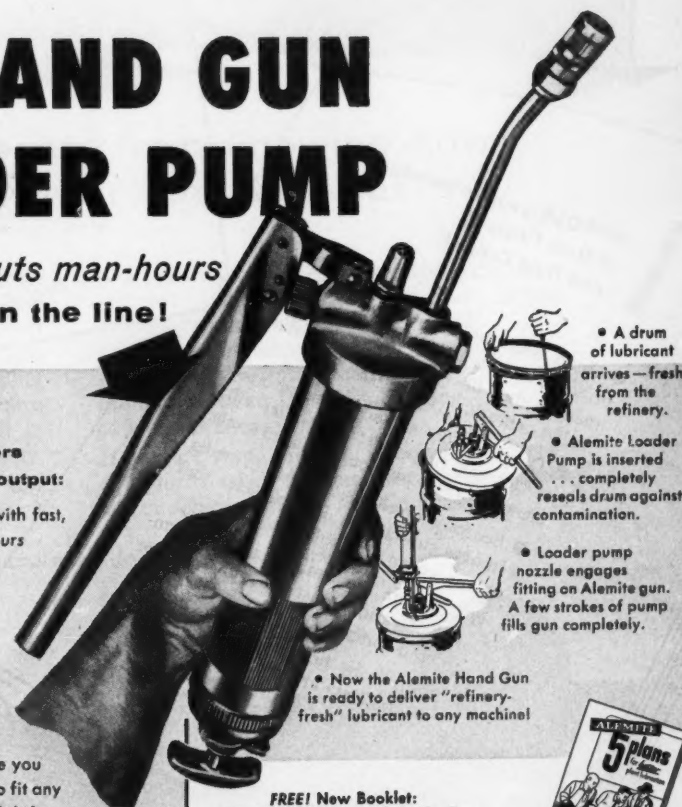
Why more and more plant managers look to Alemite lubrication for greater output:

Time studies prove it! Refilling hand grease guns with fast, efficient Alemite Loader Pumps saves you 15 man-hours for every 400-pound drum of lubricant, compared with loading the old-fashioned hand-and-paddle way!

You eliminate the cost, mess and fire hazard of "oil-room" spillage. With Alemite equipment you can transfer, load and apply lubricant that you know is completely free of dirt, grit or abrasives. Machine-hours are saved, too! With better lubricated bearings, machines stay new longer!

Alemite can furnish a hand gun of correct capacity for your operation—from 8 ounces to 2 pounds. And you get the pressure you need—up to 15,000 pounds! There is an Alemite Loader Pump to fit any standard lubricant container you normally use—stationary models for 100-lb. and 400-lb. drums; portable models for 25-lb. and 35-lb. pails.

Ask your nearest Alemite supplier for full details.



• A drum of lubricant arrives—fresh from the refinery.

• Alemite Loader Pump is inserted . . . completely reseals drum against contamination.

• Loader pump nozzle engages fitting on Alemite gun. A few strokes of pump fills gun completely.

• Now the Alemite Hand Gun is ready to deliver "refinery-fresh" lubricant to any machine!



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- See for yourself how felted filter media removes sub-micron dust particles that escape woven filter fabrics.
- Compare the features and performance of various dust filters in one easy to read comparison chart.
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Representatives in Principal Cities

IDEAS

(Continued from preceding page)

multiple skills so that they can be shifted from job to job.

Tomorrow's foreman may have to be a skilled personnel technician and a competent training director. He will no longer be able to lean on the personnel department to do his final screening for him. Because new employees will be considered permanent additions to the work force, he must be careful not to accept a man unless he is reasonably sure he is getting a good worker.

Moreover, management must give a foreman the authority to carry out his assignments. He must have a fingertip knowledge of company policies and must be informed immediately of any change in policy that affects his department, directly or indirectly.

(Taken from report "The Automotive Settlement and the Foreman" by Hiram S. Hall, published by the American Management Association, Dept. CP, 330 West 42nd Street, New York 36, N. Y.)

A Guide for Businessmen— Trademark Management

Folder describes book dealing with trademarks and brand names. Book is result of three years of research. It includes policy steps of selection, registration, correct use, protection, policing, difference between trademark and trade name, and problems of US trademark owner in foreign markets.

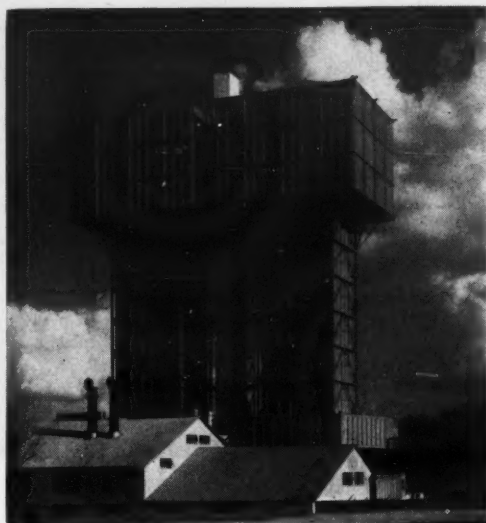
Folder describing book "Trademark Management — A Guide for Businessmen" is issued by The United States Trademark Association, Dept. CP, 522 Fifth Ave., New York 36, N.Y. When inquiring specify CP 2997 on form which is located opposite last page.

For more information on product at left, specify CP 2998 . . . see information request blank opposite last page.

Furnish fresh fertilizer for farms

Prilling towers provide a uniform product,
free from fines

Increased productivity which has been given to our soil is symbolized by the ammonium nitrate fertilizer prilling towers, shown in accompanying photograph, which rise 185' above the Kansas prairie at Spencer Chemical's Jayhawk Works near Pittsburg, Kansas. This prilling plant, one of the largest in the world,



Prilling towers at Spencer Chemical

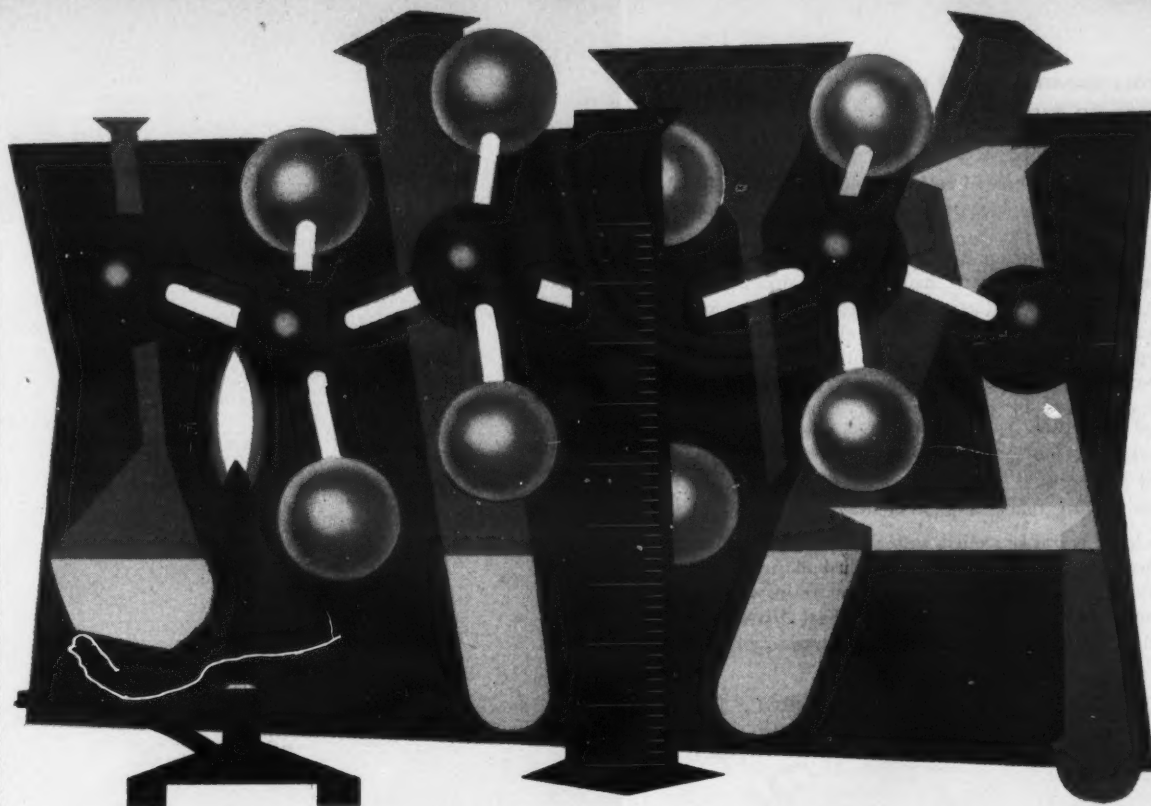
enables company to store huge quantities of ammonium nitrate in liquid form in the off season and process it quickly in order to supply fresh, uniform pellets during the peak season.

Hot, 83% ammonium nitrate is vacuum concentrated, then dropped through specially designed heads the 185' distance in order to solidify material and form uniform, 12 mesh pellets.

Regular size of material permits a uniform coating of diatomaceous earth to be applied after prilling. Also, since final product, known as "Mr. N", (containing 33.5% nitrogen) has no fines and flows freely, it handles well in distribution equipment. Normal capacity of plant is 1000 tons per day.

(Courtesy of Spencer Chemical Company, Dept. CP, Dwight Bldg., Kansas City 6, Mo.)

The Processing and Engineering Data Section
begins on page 164 this month



How can **YOU** benefit from knowing how
C. S. T. serves the chemical industry?

When a process is taken from the test tube stage and put into plant-scale production, glass tubing must be translated into four inch pipe, beakers must become 20,000 gallon storage tanks. At this point, leading companies in the chemical industry have found that it pays to call in Chicago Steel Tank Company.

You'll find the facilities and experienced personnel here

to fabricate your job exactly to specifications and meet a dependable time schedule. If your process requires alloy vessels, you'll find engineers who no longer consider the problem of fabricating stainless and other alloys difficult, even to the most exacting code requirements.

If you are responsible for specifying process equipment, take a tip from the chemical industry, call on Chicago Steel Tank Company.

Write for booklet which illustrates and describes C.S.T. facilities.



When inquiring check CP 2999 opposite last page

**Cross-country freight trains
move on huge rubber tires
instead of rails . . .**

tires are 10 ft tall and 4 ft wide; cars can travel through sand, snow, or lowland areas

Cross-country freight trains, traveling on huge rubber tires instead of rails, may open new doors to the expansion of world commerce into underdeveloped areas. Three of the transporters already have been completed, a fourth has been contracted for by the Army Transportation Corps, and several others have been ordered by private industry for use in US and abroad. A six-car freighter in northern Alaska is transporting cargoes of freight to isolated areas and an eight-car unit is currently undergoing field tests moving timber and other heavy equipment.

Each car is self-propelled with all-wheel drive. Every wheel of every car has an individual electric motor tucked into its center. Thus a six-car train, with six wheels per car, would have a 36-wheel drive. Tires range up to 10 feet tall and four feet wide, offering



Although freighters are hardly suited for everyday travel on public thoroughfares, photo illustrates their ability to maneuver sharp corners

more than 50 times the ground contact area of a conventional automobile tire. Such size, plus fact that tires operate on as little as five pounds air pressure, allows freighters to travel through sand, snow, or lowland areas where conventional equipment would bog down.

Another feature which adapts trains to rough, rocky terrain is flexibly-mounted axles. These permit wheels to roll over stumps or ditches without reflecting jolts to the rest of car. A unique steering ar-

Class H-CE five-stage compressor, one of several on the line 24 hours a day. Simple, compact, with intercoolers conveniently mounted.

CP

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serving the process industries**



Class "H" steam-driven,
single-stage booster
compressor handling
hydrocarbon gas.

Non-lubricated,
hydrogen recycle
compressor, with enclosed
distance piece; electric
motor-driven through gear
reducer.



Class O-CE four-stage,
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Note simple arrangement
of intercoolers.

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For process work, Chicago Pneumatic offers a complete line of electric and steam driven heavy-duty reciprocating compressors to handle most known gases.

Rugged in design and conservatively rated, they are ideal for continuous, round-the-clock duty; each engineered to specific job requirements with special materials, construction, capacity or pressure controls to suit.

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When inquiring check CP 3000 opposite last page

arrangement assures that last car of the freighter will follow identical tracks of first car, regardless of how many cars may be in between. When lead car makes sharp turn around given obstacle, every other car will come up to the same spot and make the same turn.

While it is true that trains run faster on a good road than a bad one, they can be operated satisfactorily cross-country or along rough jungle trails during the early stages of a road-building program. Manufacturer envisions trains criss-crossing African deserts, Arctic regions, and South American jungles. Price tags presently range from about \$30,000 to more than a quarter million dollars.

(Cross-country freighters are manufactured by R. G. LeTourneau, Inc., Dept. CP, 2399 South MacArthur, Longview, Texas . . . or for more information check CP 3001 on form opposite last page.)

U₃O₈ processing proposals invited by AEC

The AEC is interested in receiving proposals from qualified firms to process, over a 5-year period, uranium ores or concentrates to either uranium tetrafluoride, or uranium hexafluoride, with deliveries to begin about April 1959. The commission will consider proposals for any production rate up to a maximum of 5000 tons U₃O₈ equivalent per year.

Proposals may be based on arrangements whereby the U₃O₈ concentrates are supplied by the Commission and refined salts returned, or alternatively, the Commission will consider proposals for direct purchase of the refined salts from a company having or obtaining its own supply of uranium ores or concentrates. Proposals will be accepted through October 1, 1956.

(Details relative to preparation of proposals can be secured from Mr. Harold L. Price, Director, Division of Civilian Application, US Atomic Energy Commission, Washington, D. C.)

How to organize and operate photo service departments

How to organize and operate photographic service departments is discussed in 60-page book. A discussion of service photography, its purposes and applications, and a comparison between this and promotional photography opens the book. Practical approach is maintained throughout. Considerable space is devoted to facilities, organization, and administration of the department.

To obtain "How to Organize and Operate Photographic Service Departments" remit 50c direct to Eastman Kodak Company, Dept. CP, 343 State Street, Rochester 4, New York.

COMPARISON PROVES...

CONOFLOW AIRPAK

FILTER-REGULATOR

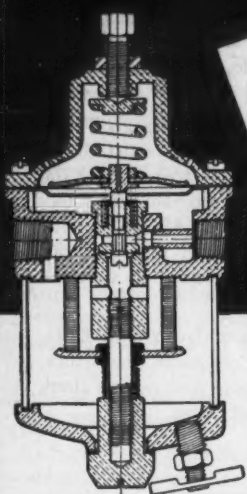
LEADS the FIELD

in

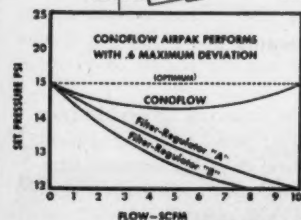
DESIGN

PERFORMANCE

LONG LIFE OPERATION



The Conoflow Airpak is a moderately priced combination reducing-relief type regulator and air filter. It is used with pneumatic controllers and in many other services requiring clean, filtered air at a regulated pressure. The Airpak surpasses all other filter-regulators in its price range for efficiency, compactness and all-around ruggedness. Check the comparison charts below:



DROOP CURVES

Smooth performing instruments demand a constant regulated air supply. The flat droop curve of the Airpak proves its superiority over two other name brand units.

DESIGN COMPARISON CHART

	Conoflow Model FH-20 Airpak	Filter-Regulator "A"	Filter-Regulator "B"
1. Number of Outlets for multiple connections	3	2	1
2. Filter Thickness	1/4"	3/8"	1/4"
3. Inner Valve	Polished Stainless Steel — Guided	Rubber Coated Brass — Not Guided	Rubber Coated Brass — Guided
4. Dripwell Capacity	9-27 cu. in. (variable)	6 1/2 cu. in. (not variable)	4 1/2 cu. in. (not variable)
5. Assembly	Standard Screw Driver only tool required	Phillips Screw Driver and Allen Wrench (1 bolt)	Standard Screw Driver and Allen Wrench (4 bolts)

The Airpak gives longer, trouble-free service because of its rugged construction including forged brass and stainless steel inner valve, assuring maximum resistance to corrosion and erosion. The larger filter and dripwell provide extended dependable operation without servicing. A standard screw driver is all that is required for quick, easy teardown because of the Airpak's unique, single-bolt construction.

Make your own comparison and you will see why companies like duPont, Leeds & Northrup, Bristol, Honeywell, Sheffield, Builders Iron Foundry, M. W. Kellogg and many others have learned to rely on the Conoflow Airpak.

WRITE FOR BULLETIN H-2 CONOFLOW PNEUMATIC REGULATORS C-600

Cono Controls

CONOFLOW CORPORATION

Foremost Manufacturers of Final Control Elements

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Instrumentation & control

In the competitive business of making ammonia, processes must be kept running at top-notch efficiency. At Shell Chemical's Ventura, California plant...

four robot chemists make routine analyses

... and cut lab work from 48 hours a week to just a few hours a week

By BRUCE FADER, Associate Editor

In operation for about two years, Shell Chemical's Ventura, California plant makes extensive use of automatic analyzers. Starting with natural gas and air, plant produces agricultural and industrial ammonia. Stream analyzers are used to monitor composition of material at various stages of process, hold efficiencies high, and prevent unhealthy conditions that could lead to catalyst poisoning, lowered output, and so forth.

When plant started, laboratory was called

on to check every analyzer reading. While bugs were being worked out of system, plant depended on laboratory findings to guide operation.

Now, with all instruments proved out and adjusted, they are relied on primarily. Lab work has been cut from 48 to just a few hours a week. Results are available from analyzing instruments as changes are taking place. And reading of one analyzer can be checked against another to insure accurate operation.

Analyzing for Hydrogen

In four streams of the process — raw gas, synthesis make-up, both synthesis circulating gas streams — hydrogen content must be found. Principle of operation of instrument used in this analysis is a measurement of thermal conductivity on gas sample. Since hydrogen is six to eight times as good a conductor as other common gases, this is an easy way to analyze for it.

Current is passed along a platinum filament which heats from the I²R. Temperature of this filament can be found by measuring its resistance. And this temperature, in turn, is an index of thermal conductivity of gas sample surrounding the filament.

An excellent method for finding hydrogen in two-component systems, this technique needed some adjustment to compensate for CO₂ in raw gas, argon and methane in circulating gas. With factory settings of the instrument (based on nitrogen as second gas), hydrogen readings varied as much as

(Please turn to page 60)

Analyzing for Carbon Compounds

To find three carbon-containing materials — methane, carbon dioxide, and carbon monoxide-dioxide mixture — three similar infrared analyzers are used. These are double-beam, non-dispersive instruments using a sensitized microphone detector. Infrared traverses two parallel paths — one containing sample and one containing a reference gas. Difference in energy received by two detectors is amplified and recorded by a Brown recorder. Calibration of this recorder is directly in terms of concentration of the measured component.

Finding methane by this method has been reliable and accurate. A cycle timer switches instrument automatically to monitor four gas streams. Range of samples analyzed runs from 0.2% methane in synthesis make-up to about 7.5% in primary reformer exit gas. Aside from a slight adjustment in range to make instrument and lab results agree, there has been no trouble with this

(Please turn to page 60)

When inquiring check CP 3002 opposite last page



Shell Chemical's ammonia plant at Ventura, Calif. is using four robot analyzers to make routine checks

Analyzing for Argon

To check for argon in recirculating nitrogen, Shell is using an analyzer which measures ionization current through sample. Sample gas is ionized in a cell by Strontium-90 while reference nitrogen is ionized in another cell. Difference in current carried by these two cells is amplified and recorded as argon concentration.

This is another technique which works well with a two-component system, but which requires some adjustment and compensation to work well in this plant. Two principal impurities in the argon-nitrogen mixture are hydrogen and ammonia. Some methane may also be present. Hydrogen is first removed from the gas stream by diffusion through a heated palladium tube. Problem boils down to errors from ammonia, since, in this plant, methane is seldom an offender.

Because ammonia produces an ionization current about as great as the current pro-

(Please turn to next page)

Analyzing Copper Liquor

A previously untried instrument monitors copper liquor (copper ammonium acetate solution) for cupric ion and free ammonia. Copper ion is found colorimetrically. Ammonia is found by a thermal conductivity device which measures vapor pressure.

This device was built specially for the job by Shell Development Company — it is still in a prototype stage. Operations with it to date indicate that the electronics section is fine. A better mechanical approach will probably be devised, however. Chief difficulty lies with a small amount of copper and iron oxide sludge which forms on cell walls and in orifices. Filters tried so far fall in two classes — those which allow sludge to pass, and those which plug rapidly. Original design did not permit easy cleaning of the cell, but this has been rectified.

While there remains some work to be done on this device, present indications are that it will be both practical and useful.



How to select the right liquid meters

... to save time and ingredients, with closer quality control, and more accurate cost accounting. That's the subject of this helpful free bulletin. It covers meters for measuring hot and cold water, oils, syrups, brines, soap solutions, and many other chemical solutions that can be handled by composition bronze meters. Illustrates sizes from 1/2" to 6", with rates of flow to 1000 gpm. Registers range from simple counters to the newest Auto-Stop automatic batching meters. A gold mine of information for any processing engineer. Bulletin 566U P.

Get started now! Write or phone nearest Neptune office, or check off the Reader Service Card in this publication.

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Solution
Asphalt, Liquid
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Barium Chloride
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Boiled Oil
Borax Solution
Brine
Bronzing Liquid
Bunker "C"
Butanol
Calcium Chloride Brine
Carbon Bisulphide
Carbon Tetrachloride
Castor Oil
Cellulose Solvent
China Wood Oil
Chloropicrin
Chocolate
Cleaner, Asphalt Tile
Cocoa Butter
Coconut Oil
Code Rubber Oil
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Corn Syrup
Cotton Seed Oil
Crude Oil
DDT
Dextrose Solution
Diacetone
Dibutyl Phthalate
Diethyl Carbitol
Diethylene Glycol
Diethyl Hexyl Phthalate
Dimethyl Phthalate
Dioctyl Phthalate
Dope (Nitrocellulose)
Esther Gum Oil, Drying
Ethyl Cellulosolve
Ethylene Glycol
Fish Oil
Formaldehyde
Froon
Fuel Oil, Hot
Glucose
Glue, Water Solution
Glycerine
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Ink, Oil Vehicle
Ink, Water Vehicle
Isobutylene
Isopropanol
(Isopropyl Alcohol)

Kerosene
Lacquer
Lime Water
Linseed Oil
Liquid Soap
Liquid Sugar
Lubricating Oil, Hot
Lubricating Oil
Mesityl Oxide
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Nitrocellulose Lacquer
Oleic Acid
Oleum Spirits
Orthodichloro Benzene
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Paraffin Oil
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Perfume
Petroleum
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Propylene Glycol
Pyrethrum Mixtures
Rum
Shellac, Alcohol Sol.
Silicone Oil
Silicon Tetrachloride
Size Solution
Soap Solution
Sodium Benzoate
Sodium Carbonate
Sodium Chloride
Sodium Silicate
Soy Bean Oil
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Stearic Acid
Stoddard Solvent
Styrene Monomer
Sugar Syrups
Tallow
Tannic Acid
Tire Compound
Trichlorethylene
Tricresyl Phosphate
Tungwood Oil
Turpentine
Varnish
Vasol
Vinyl Lacquer
Water
Wax Emulsions
Whiskey
Wine
Xylol

148 INDUSTRIAL LIQUIDS ARE LISTED...
How many of these can you handle better with Neptune Meters?

When inquiring check CP 3003 opposite last page

ROBOT CHEMISTS

Analyzing for Hydrogen

(Continued from page 58)



This hydrogen analyzer is used with a roundchart recorder calibrated in per cent hydrogen

51½% from lab findings. By adjusting zero and span this deviation has been brought down to 0.4% over a two month period — and of that, 0.2% is attributable to fluctuations in CH₄, CO₂, and CO. Accuracy on synthesis make-up gas is even better than this.

(Hydrogen analyzers were furnished by Leeds & Northrup Company, Dept. CP, 4901 Stenton Ave., Philadelphia 44, Pa. . . . or for more information check CP 3004 on form opposite last page.)

Analyzing for Carbon Compounds

(Continued from page 58)

instrument since its installation. Direct-reading charts for this analyzer resemble logarithmic scales. Accuracy is good in the 0 to ½% range and reasonable out to 10% methane.

Carbon oxides instruments are alike except for range, filling gas in microphone, and use of a water-cooled infrared source in the total oxides instrument. Both instruments achieve high sensitivity — full scale for 200 ppm CO₂ and full scale for 50 ppm combined oxides.

To compensate for amplifier drift, each of the carbon oxides instruments is periodically "zeroed." Cycle timer switches reference gas into sample chamber, instrument sets itself to zero. Circuit was modified to permit instrument to standardize at any point on scale — thus readings can be made to agree closely with lab checks.

(Infrared analyzers were built to a Shell Development Co. design by Applied Physics Corp., Dept. CP, 362 W. Colorado Street, Pasadena 1, Calif. . . . check CP 3004A opposite last page.)

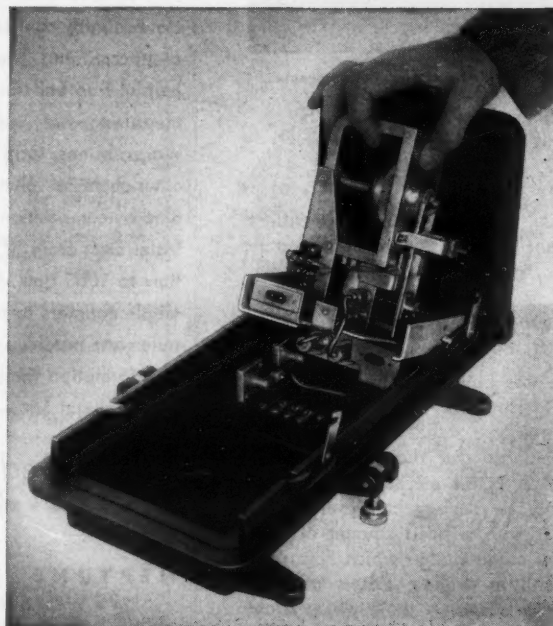
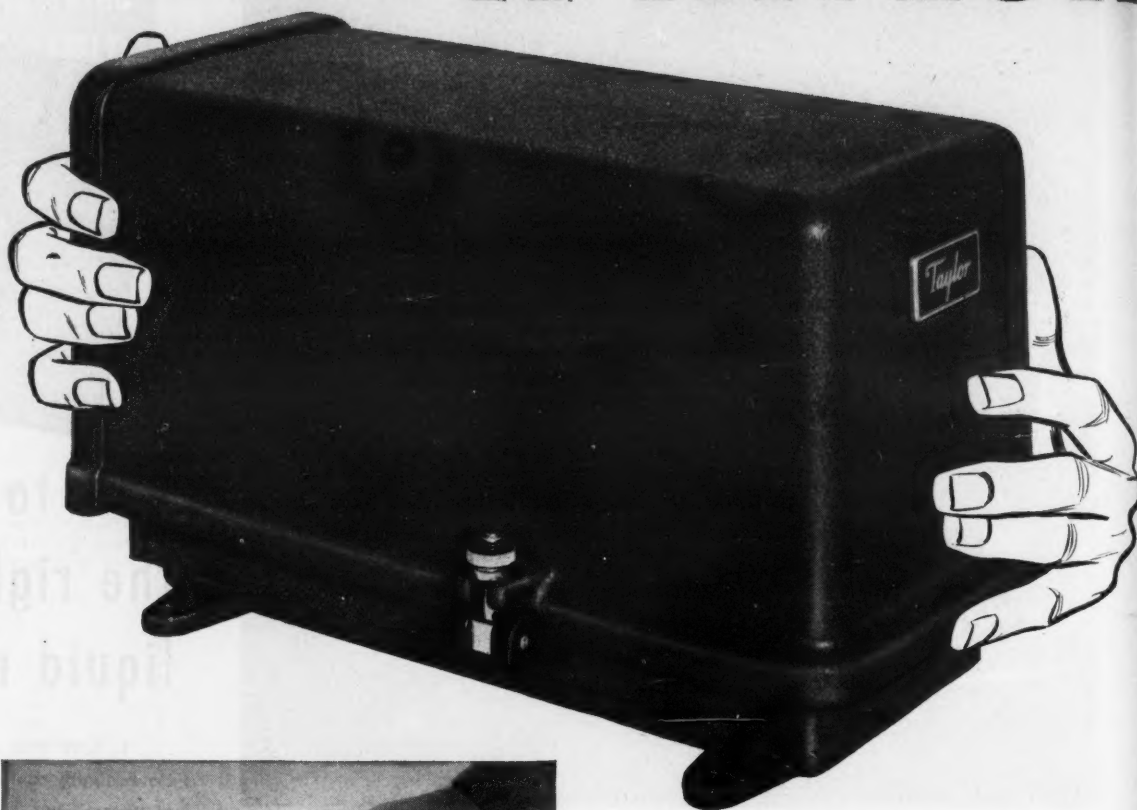
Analyzing for Argon

(Continued from preceding page)

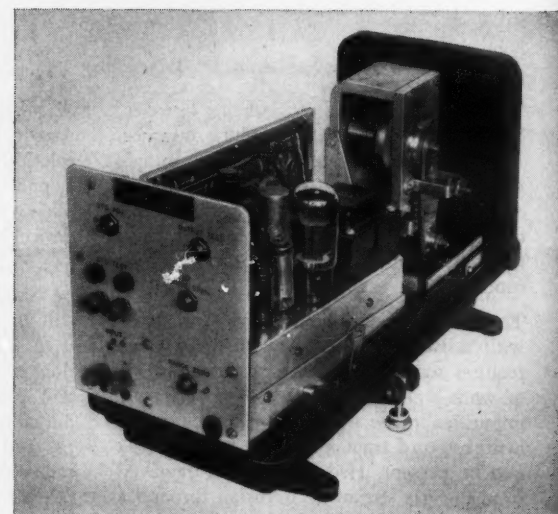
duced by Argon, Shell engineers tried to remove it from sample. Silica gel absorbers, first scheme tried for this purpose, plugged, and were not completely satisfactory. Then it was found that ammonia concentration did not vary much — correction could be made by subtracting a constant figure from the total "argon plus ammonia" reading.

One more correction is applied to the analysis. Since results are more useable as argon in a hydrogen-containing atmosphere basis (instead of hydrogen-

Now! A TAYLOR P



Plugging in the Transducer. This exclusive plug-in feature applies to both the transducer and the amplifier. Means quick, easy removal for service; minimum instrument down-time; checking can be done in the shop where full facilities are available. Also permits separate calibration.



Plugging in the Amplifier. See how easily units are locked into the chassis. Also note screwdriver adjustment of range span and zero suppression by virtue of unique potential dividers. Exclusive Taylor vernier adjustment permits resolution of 1 part in 100,000.

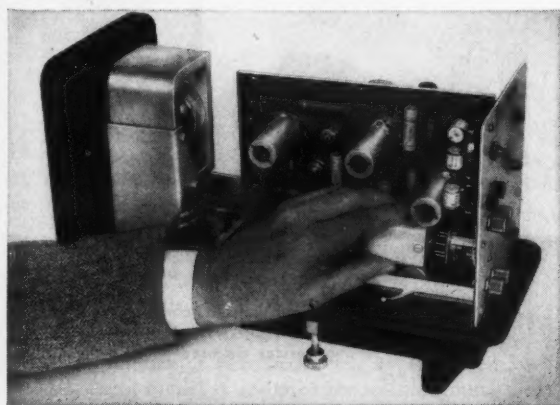
R POTENTIOMETER TRANSMITTER

with all the innovations, ruggedness, dependability and versatility that industry expects from Taylor

TAYLOR has broadened its base of measurement with the introduction of an electronic instrument that extends the versatility of its pneumatic controllers and receivers. The TRANSET* Potentiometer Transmitter is a completely adaptable instrument for the measurement of a wide variety of variables, and can be quickly modified for use with different electrical primary elements. This ingenious instrument reflects Taylor's years of experience and knowledge of the requirements of the processing industries.

The TRANSET Potentiometer is especially adaptable where processing conditions require pneumatic controllers and receivers, and where conventional measuring circuits have not proved adequate. In thermocouple applications, for example, it can accurately measure temperatures within limits of minus 320°F. to plus 3272°F., with range spans as short as 100°F., depending upon the characteristics of the thermocouple used.

*Reg. U.S. Pat. Off.



Plugging in the Input Circuit Board. It can be quickly adapted for use with different primary elements by simply plugging in the corresponding input circuit; e.g., for thermocouple applications cold junction compensation is provided in the plug-in circuit board. One instrument can therefore be used as a spare wherever a transmitting potentiometer is used.

Why experienced instrument men say— "most practical instrument of its kind"

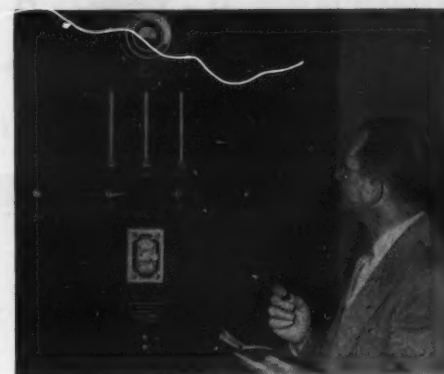
1. The unit is automatically, continuously standardized and offers complete electronic balance, permitting optimum response adjustments. There are no slide wires or motor drive.
2. High Input impedance. No need to match resistance of leads.
3. Output impedance is virtually infinite. Its 0 - 5 milliamp signal can perform multiple auxiliary functions without affecting accuracy of pneumatic signal.
4. Range span and zero suppression adjustments are easily made by screwdriver due to unique design of high resolution potential dividers.
5. Both electronic and pneumatic units plug-in. Simplifies service; permits separate calibration.
6. Normal load is automatically inserted when amplifier is removed for service.
7. Modern printed circuits insure uniform performance. Test terminals provided for trouble shooting.
8. Three-circuit jack on front panel permits easy monitoring of output current. Convenient pin jacks provided for checking standardization voltage.
9. Three-piece, purged cast-aluminum case is moisture and corrosion proof. All adjustments are readily accessible.
10. If used only for scanning, logging or similar auxiliary functions the instrument is available without transducer.

Write for Bulletin #98262. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Taylor Instruments
— MEAN —
ACCURACY FIRST

IN HOME AND INDUSTRY

When inquiring check CP 3005 opposite last page



Ionization current is used to measure argon content with this instrument

free as found), a nomographic correction was applied. To eliminate this correction, zero and span of the instrument have been changed. A modification equipped instrument with hydrogen and methane "input dials." Now operator sets dials from readings of methane and hydrogen analyzers and reads "argon plus ammonia" directly.

(Basic instrument for argon analysis was designed by Shell Development Company and supplied by Hallikainen Instruments Co., Dept. CP, 1341 7th St., Berkeley, Calif. Check CP 3004B opp. last page.)

Detects minute level changes using capacitance of tanks . . .

electronic signals are converted into proportional pneumatic output

Uses: Detecting minute changes in levels in tanks, drums, process baths, pipe lines.

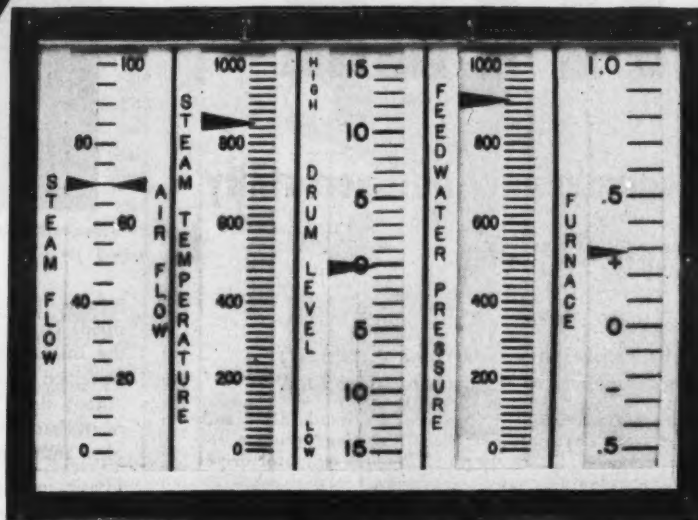
Features: Level controller gives high-speed response. Unit is largely unaffected by external changes in voltage, air supply, temp, pressure.

Description: Sensing element determines change in electrical capacitance. Electrical signal is converted by instrument into proportional pneumatic output. Modulated air output is sufficiently powerful to operate control valves, other pneumatic control equipment. Unit can be adjusted to give full range of air pressure output for a two-foot change in level of a hydrocarbon or similar low dielectric material. Response is greater from high dielectric materials like water. Air output signal may be connected for either forward or reverse operation. Device can be supplied in dust-proof and explosion-proof cases.

(Pneutronic level control is product of Fielden Instrument Div., Robertshaw-Fulton Controls Company, Dept. CP, 2920 N. Fourth Street, Philadelphia 33, Pa. Check CP 3006 opp. last page.)

announcing

a new line of **small-size**
easy-to-read gauges
and receivers



NEW REPUBLIC 5 GAUGES

Individual, Independent Measuring Units for

DRAFT • PRESSURE AND VACUUM • DIFFERENTIAL PRESSURE • TEMPERATURE

High Accuracy Receivers for Pneumatic Transmitters and Electric Meters Measuring

FLOW • PRESSURE • CO₂ • DENSITY • LIQUID LEVEL • OTHER PROCESS VARIABLES

Important Features

- FIVE INCH ILLUMINATED SCALES
- INDEPENDENT, INTERCHANGEABLE UNITS
- MULTIPLE OR INDIVIDUAL MOUNTING — from one to eight units to a single case
- EASILY MOUNTED — no panel drilling necessary in most cases
- SCALES EASILY CHANGED OR COLOR-CODED
- POINTER MOTION REVERSIBLE
- SIMPLIFIED CONNECTIONS AT BACK OF CASE
- REMOVAL FROM FRONT OR BACK

Now you don't have to sacrifice instrument performance and readability to size considerations. With Republic's new line of small-size VS Gauges, you can save panel space, make more compact instrument groupings and *still* get the accuracy, sensitivity and readability you would expect from conventional sized instruments. Full sized diaphragms, bellows and helix units in VS Gauges assure "big" gauge performance in an instrument that requires only one-fourth the panel space of conventional gauges. Five inch scales are almost flat and are indirectly illuminated as a standard feature for easy reading — even from a distance.

● Write for New VS Bulletin ▶

REPUBLIC FLOW METERS CO.

2240 Diversey Pkwy., Chicago 47, Illinois



When inquiring check CP 3007 opposite last page

INSTRUMENTATION & CONTROL

Offers guide to literature on instrument line

Reissue of 24-page index to manufacturer's instrument literature describes dozens of available publications. These, in turn, apply to automatic controls, measuring instruments, or various manufacturing processes. In addition to the chemical processing field, literature applies to heat-treating, atomic energy, power generation, scientific research, steel production, ceramics, and other subjects.

Booklet ENT (1) is issued by Leeds & Northrup Co., Dept. CP, 4901 Stenton Ave., Philadelphia 41, Pa. When inquiring specify CP 3008 on form opposite last page.

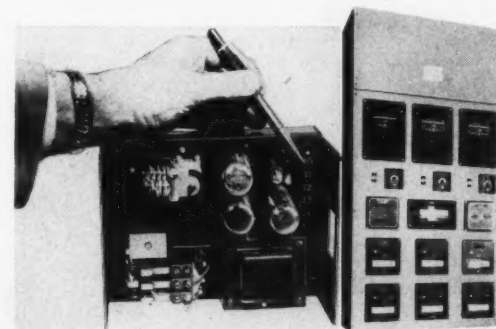
Conduction, infrared rays show flame condition in boiler . . .

predominant electron flow in direction of flame acts as rectifier-detector

Uses: Safety systems for industrial boilers.

Features: Two kinds of sensing elements are used in flame detection systems — flame rectification and infrared radiation.

Description: Conductivity and rectifying properties of flame are used to detect its presence. An electrode (flame rod) projects into flame zone. This is one side of an AC circuit with other electrode being the nozzle. When flame conditions are



Control unit (left) is shown with cover removed. Panel at right is typical setup where several flame sensing devices are used

normal, a small current flows between these electrodes — predominantly in the direction of the flame. Electrical link between grounded burner nozzle and conventional flame rod pickup is sufficient to sense flame's presence.

This conductivity-rectification sensing can be used on oil as well as gas flames. In the case of oil

flames, a photoelectrical (lead sulfide) cell activated by flame luminosity provides "flame-on" link. Using two pickups together, photocell acts as an agent for passing a "flame-only" current when flame is present. Flame failure is instantly sensed by cell so that alarm and shutdown can be made.

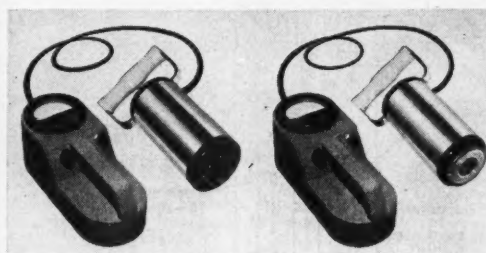
(Flame-Otrol Models 1500 and 1400 are developments of Wheelco Instruments Div., Barber-Colman Co., Dept. CP, 1300 Rock St., Rockford, Ill. . . . or for more information check CP 3009 on form opposite last page.)

Indicates percentage moisture content in 3 sec . . .

moisture register allows fast "spot check" and does not mar "paper" sample

Uses: Fast moisture indication of sheet plastic, hardboard, asbestos-cement siding and roofing materials, gypsum board, sheet rock, similar materials.

Features: Instrument is light-in-weight and portable allowing its use on production line as need requires. Each test takes only 3 sec and can be made by non-technical personnel.



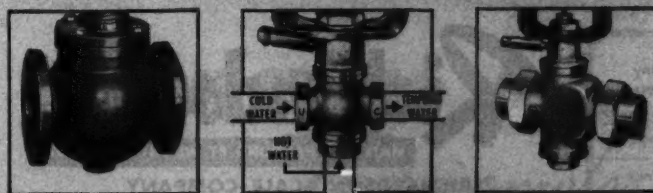
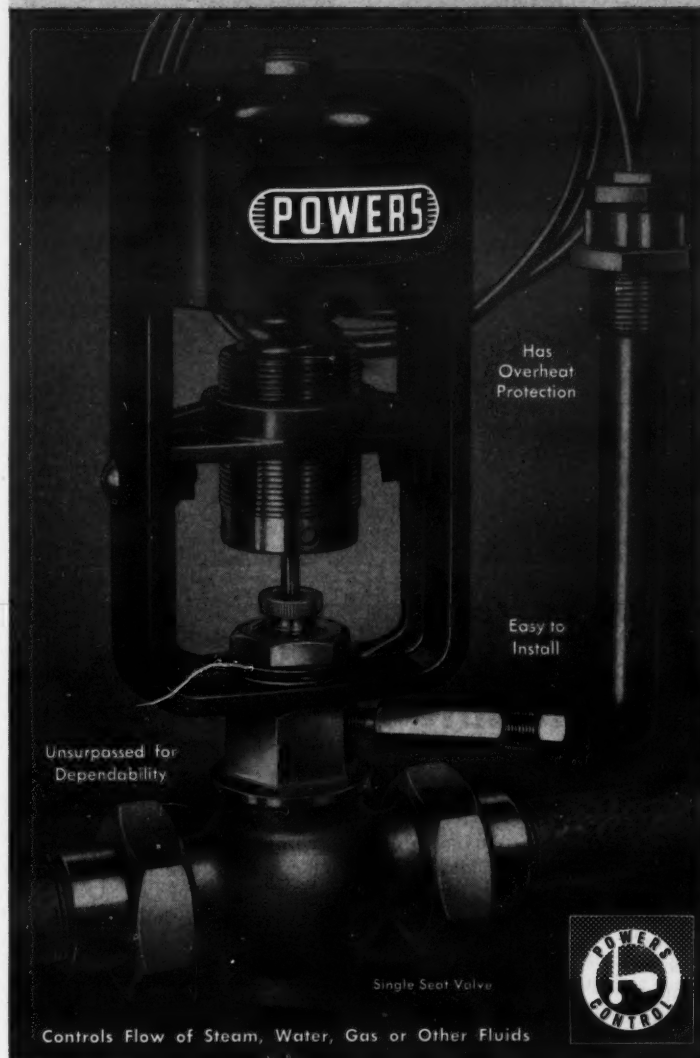
Moisture tester at left is designed for irregular surfaces. Unit at right tests flat surfaces

Description: Instrument operates on principle of high-frequency power absorption. Three models have been developed to allow testing of different materials. One model has a spring-loaded button electrode for measuring irregular or curved surfaces, has "electronic penetration" of 1" and is designed for testing rolls of paper or paper board. Second model has large electrode for use on individual thicknesses or thin stacks, has a penetration of 1/8". Third model is designed for testing granular or powdered materials. Operation of instrument does not mar sample tested.

(Moisture register instrument is product of Moisture Register Company, Dept. CP, P.O. Box 910, Alhambra, Calif. . . . or for more information check CP 3010 on form which is located opposite last page.)

POWERS No. 11 Self-Operating **TEMPERATURE REGULATOR**

Automatically holds temperature constant at the right point.
Prevents losses caused by wasteful OVER-heating.

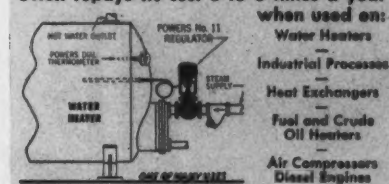


Various Valve Bodies and Inner Valves are available. Single and Double Seat Valves thru 2" have rugged bronze bodies with bronze union connections for quick, easy installation. Bulletin 329 gives information about all types.

(c111)

Why It Gives **BETTER CONTROL** and Saves More Money

Often repays its cost 3 to 6 times a year when used on:



ONLY POWERS No. 11 REGULATOR **Offers ALL These Advantages**

- **Simple, sturdy construction.** Materials used are corrosion resistant.
- **Powers bellows has 50% more power** than used in the majority of regulators. The heart of a self operating regulator is its bellows. Powers with its 50% greater effective area gives better control and its durable 2 ply bellows outlasts ordinary single ply bellows.
- **Valve stem lubricator** with silicone grease aids easy movement of highly polished stainless steel valve stem and reduces drying out of packing.
- **BETTER CONTROL** results from Powers powerful bellows and minimum of valve stem friction.
- **60°F. temperature ranges** available with accuracy of $\pm 1^\circ\text{F}$. on some processes and 2 to 3°F. on others.
- **Rugged bronze valve bodies with bronze union connections**, for single and double seat valves thru 2", reduce installation time and labor. Larger sizes have flanged iron body valves.
- **Powers Nationwide Service and 24 Hour Delivery** in the U.S.A. are important time and money saving advantages.



● **Indicating Regulator** with easy to read 4" dial thermometer helps adjust the regulator and check temperature at the bulb. Various dials and ranges are available.

Right type and size of valve is important for good control. May we help you make the right selection? Benefit from

POWERS more than 60 years experience with self-operating regulators.

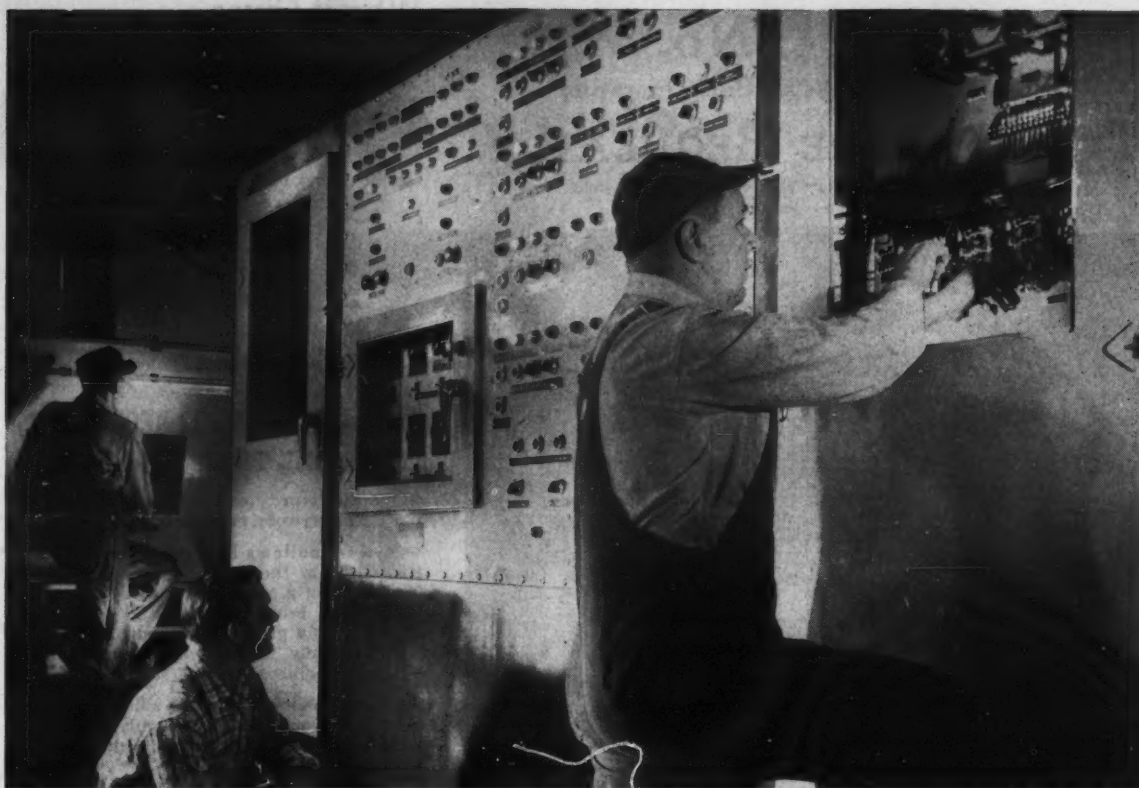
Call our nearest office or write us direct for Bulletin 329.

THE POWERS REGULATOR CO.

Skokie, Ill. | Offices in Chief Cities in U.S.A. Canada and Mexico | See your phone book Automatic Temperature and Humidity Control

Established 1891

When inquiring check CP 3011 opposite last page



Worked to death... to insure the life of your proportioning system

If there's anything worth its weight in gold in a proportioning system control panel, it's *dependability*. Before a single electrical component was designed into this panel being wired at Richardson Scale Co., its prototype had been literally worked to death in a controlled testing operation. It's survival of the fittest... and only the fittest is acceptable. Richardson's reputation as a producer of dependable control panels rests, in the last analysis, on the selection of tested components and on intensive and varied experience in applied electronics.

In addition, Richardson supplies each control panel

completely wired and pre-tested, invites the customer to familiarize himself with it *before installation* and takes responsibility for complete system operation. Detailed instructions and diagrams are supplied for each job.

But this is only part of the story. The best of control panels will not pinch-hit for a poor automatic weighing unit, mis-applied materials feeding equipment or improper storage bin design. Richardson know-how in this field embraces 50 years of experience in handling over 400 materials.

When it comes to proportioning, you're in good company when you come to Richardson. Look at some of the others who now have proportioning by Richardson:

The Firestone Tire & Rubber Company • General Foods Corp.
General Electric Company • U. S. Bureau of Mines
Reynolds Metals Company • American Rice Milling Co., Inc.
Union Carbide & Carbon Corporation • Ford Motor Co.
Fleischmann Distilling Corp. • The Flintkote Company
Johnson & Johnson • National Distillers Products Corp.
Owens-Illinois Glass Co. • Pittsburgh Coke & Chemical Co.
Celanese Corp. of America • Goodyear Tire & Rubber Co.
E. I. Du Pont de Nemours & Co., Inc. • and many more.

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

RICHARDSON SCALE COMPANY
Clifton, New Jersey

Atlanta • Boston • Buffalo • Chicago • Cincinnati • Detroit
Houston • Memphis • Minneapolis • New York • Omaha
Philadelphia • Pittsburgh • San Francisco • Wichita • Montreal
Toronto • Havana • Mexico City • San Juan

Richardson Scales S.A. 1-3 Rue de Chantepoulet,
Geneva, Switzerland

When inquiring check CP 3012 opposite last page

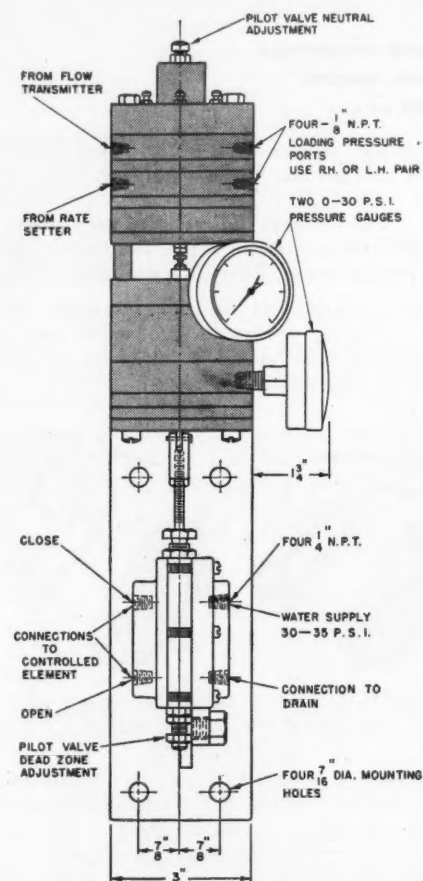
INSTRUMENTATION & CONTROL

Controls flow or pressure in waste treatment units or water filtration...

pilot valve responds to changes of 0.1% in differential loading pressure

Uses: Controlling flow or pressure in water filtration and waste treatment plants.

Features: Unit can be wall-mounted and will not occupy floor space. It will respond readily to changes in differential pressure corresponding to 0.1% of full scale.



Required piping connections for pneumatic control

Description: Pilot valve control unit is a pneumatically-actuated transducer. Complete unit weighs only 15 lb and is 16" long.

Unit operates by converting differential between flow transmitter and rate setter. Instrument has a pneumatic-operated power booster for amplifying pressure differential.

Clean, dry air of instrument quality is required, regulated to 20 psi. Maximum thrust output is 22 lb. Materials of construction are anodized alumi-

num, stainless steel, brass and nylon. Special materials can be used for unusually corrosive service.

(BalanCel Pilot Valve is product of Builders-Providence, Inc., Sub. of B-I-F Industries, Inc., Dept. CP, 345 Harris Avenue, Providence, R.I. . . . or check CP 3013 opposite last page.)

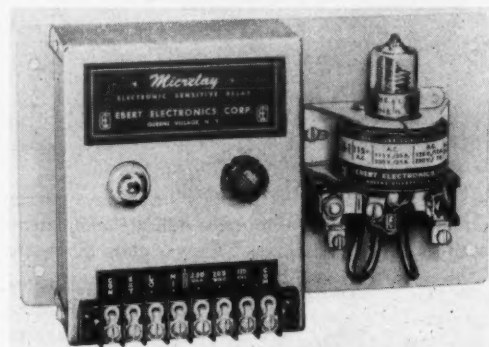
Three microamperes trip relay handles loads to 60 amp . . .

mercury relay for power handling has indefinite life in heavy-duty service

Uses: Relay trips with minute currents from high impedance sources.

Features: Extremely sensitive, relay is capable of handling high loads — 60 amperes peak or 3 hp at 115v AC.

Description: Sensitivity of relay is such that low current, low power, and high impedance sources such as photocells or electrodes in "non-



Sensitive relay operates from signal sources with impedances to 10 megohms

conducting" liquids are sufficient to trip it. Source impedances from 10 megohms to 100,000 ohms can be used. Tripping current is 3 microamperes. Other models handle smaller loads (35 amp or 2 hp at 115v AC). Designs are available for normally-open or normally-closed operation.

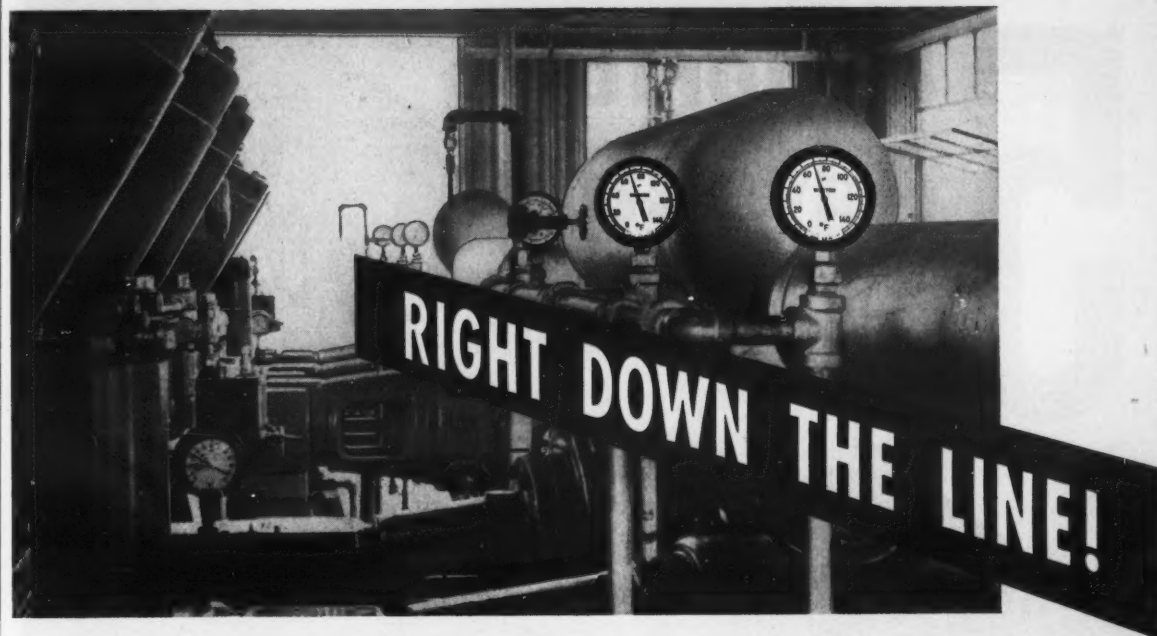
AC can be used to power relay though no rectifiers or delicate parts are employed. Relay circuit achieves isolation from power line so that control circuit is safe to use. Closure time is about 35 milliseconds.

For field operation or where AC may not be conveniently used for sensing circuit, DC of 9 volts or more or AC of 12.5 volts or more may be used to power control end.

Dimensions of relay are $2\frac{1}{4}$ x 5" high. Relay is $8\frac{3}{4}$ " long.

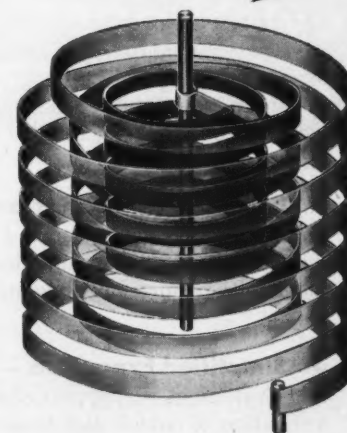
(Micrelay is a development of Ebert Electronics Corp., Dept. CP, 212-20T Jamaica Ave., Queens Village 28, N.Y. . . . check CP 3014 opp. last page.)

DEPENDABILITY



*Weston thermometers
with Multiple* bimetal helix*

The reasons why WESTON all-metal industrial thermometers excel in dependability and long life . . . enjoy such outstanding preference throughout industry . . . stem in large part from Weston's exclusive design and manufacturing methods. The critical sensing elements are all Weston-made in the shorter *multiple helix* form to insure rugged, nonsagging units. They are then *cycle-seasoned*, over broad temperature ranges, to insure *consistently precise indications* over far longer periods. Thus they serve better, longer, at far lower over-all costs. Bulletin containing sizes, ranges and prices, available on request. WESTON Electrical Instrument Corporation, 614 Frelinghuysen Ave., Newark 5, N. J.



WESTON
Thermometers

AVAILABLE THROUGH LEADING DISTRIBUTORS

When inquiring check CP 3015 opposite last page

Factory-Assembled Lineup Offers

5 Important Advantages

**TYPE H
STARTERS**
for 2300 to 5000
Volt Motors

1. Centralized Control — All high voltage control for an entire department or plant may be concentrated in one place. When located in a separate control room, starter lineup operates in cleaner atmospheres. It also may be made inaccessible to unauthorized personnel.

2. Low-Cost Installation — Control group is factory-assembled and bussed. Conduit layout is greatly simplified. For example, lineup requires only one incoming power feeder.

3. Simplified Expansion — Internal bus and convenient wiring provision plus standardization of cubicle size facilitate addition of starters. Each starter unit is self-contained.

Expanding the lineup is merely a matter of adding a starter and connecting the bus.

4. Attractive Appearance — Uniformity of cubicles presents a modern, streamlined appearance.

5. One-Company Responsibility Complete responsibility for assembling proper control devices and for control performance rests with Allis-Chalmers.

A-4704

For complete information, see your A-C representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS



When inquiring check CP 3016 opposite last page

INSTRUMENTATION & CONTROL

Features direct flow thru meter chamber

Units not position-sensitive or affected by outside vibrations

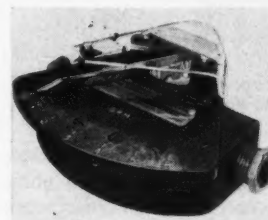
Utilizing direct flow through meter chamber, design keeps housing clean and flexing of vane prevents accumulation of scale or sludge.

Flexible vane is riveted to body at one end, leaving other end free to traverse an arc equal in length to the calibrated scale. A horseshoe section



Vane pointer is visible in dense colored fluids or gases

of the flexible vane permits necessary motion under flow. Design eliminates delicate components such as pivots, bearings, bellows, glass tubes, etc.



On enclosed meter, pointer is coupled to vane magnetically, eliminating packing glands, blind bearings and leakage possibilities. Plastic scale cover keeps instrument clean and readable under

plant conditions. Scale is approximately uniform.

Meter is also available with transparent face to permit viewing liquid or gas flow. This is useful where color changes occur in material to indicate oxidation, contamination, waste pick-up, etc.

Meter operates in same manner as enclosed unit except that attached to vane is a highly polished pointer that travels beneath the plastic cover and indicates flow. Brightness of the pointer and its proximity to cover make reading easy in dense colored fluids of gases. Meters are not affected by position or outside vibration.

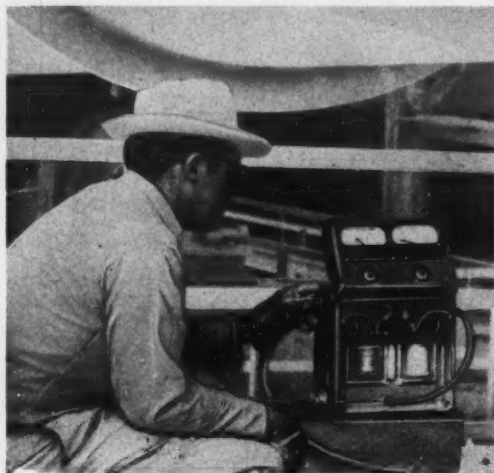
(Meters are produced by Scully-Jones and Co., Dept. CP, 1901 S. Rockwell St., Chicago 8, Ill. Check CP 3017 opposite last page.)

Analyzes for oxygen and combustibles in gases . . .

25-pound combustion analyzer is portable

Uses: Analyzing for oxygen and combustibles in flue gases from cement and lime kilns, ceramic and refractory kilns, steam boilers, direct and indirect-fired furnaces in metals industries.

Features: Unit is portable, weighing about 25 lb. Meters continuously indicate per cent by volume of oxygen and combustible gases.



Two meters indicate per cent by volume of oxygen and combustible gases

Description: Complete package includes sampling pump, hose and tip, thermocouple and analyzer. Unit operates on 110v AC. Oxygen and combustible meters have both 4% and 20% range spans. Oxygen indicator is provided with an additional scale for measuring output of instrument thermocouple in degrees F.

(Heat Prover is product of Bailey Meter Company, Dept. CP, 1050 Ivanhoe Road, Cleveland 10, Ohio. Check CP 3018 opposite last page.)

Seven control data sheets about plant problems

Seven data sheets suggest solutions to control problems on pH, oxidation-reduction potential measurement, pneumatic loading, filtration rate control. These sheets are designed to suggest time-saving, cost-saving procedures.

AED #220-5, 220-17, 220-56, 220-62, 220-68, 282-21, 831-32 are issued by The Foxboro Co., Dept. CP, Foxboro, Mass. When inquiring specify CP 3019 on form opposite last page.

Look For More Penberthy Installations During '56



Clear, Accurate... Easily Installed and Maintained for tanks, containers and flow lines...

PENBERTHY GAGES

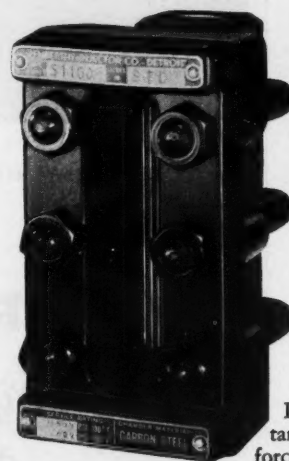
...with exclusive Raised Face

REFLEX liquid level gages.

TRANSPARENT water and liquid level gages.

TRANSPARENT High Pressure liquid level gages.

Frost-free Gages, Heating Tube and Heating Chamber Gages, Welding Pad Gages, Large Chamber Gages, Inclined Gages and Explosion-proof Illuminators.



PENBERTHY GAGE VALVES

...with exclusive

Floating Shank

Tubular and Threaded gage valves • Jacketed Gage Valves • Instrument Valves • Wire glass protectors, plate glass protectors, sheet metal guard protectors.



Liquid Level GAGES and Gage Valves by PENBERTHY

• The Penberthy line is designed specifically for chemical industry service. They are rugged and reliable . . . engineered with exclusive features to save you time and money.

Savings of 50% and more on installation costs alone are credited to the "floating shank" of Penberthy Gage Valves. It compensates for variations in center-to-center distances of tank tappings or gage assemblies . . . eliminates strains of forced installations.

Cleaning or replacement of gage glass is facilitated by the "Raised Face", standard only on Penberthy Gages. Perfect alignment of frame with glass and gasket is assured also.

Feature for feature, Penberthy offers you the best value for your dollar. Compare the line shown in Catalog 35 with any other. We'll be glad to send you this catalog on request. Also sold through supply stores in most fields.

PENBERTHY INJECTOR COMPANY

Division of the Buffalo-Eclipse Corporation

1242 HOLDEN AVENUE

DETROIT 2, MICHIGAN

When inquiring check CP 3020 opposite last page

Change rotameter tube without removing from line

Uses: Meters small flows of liquids or gases.

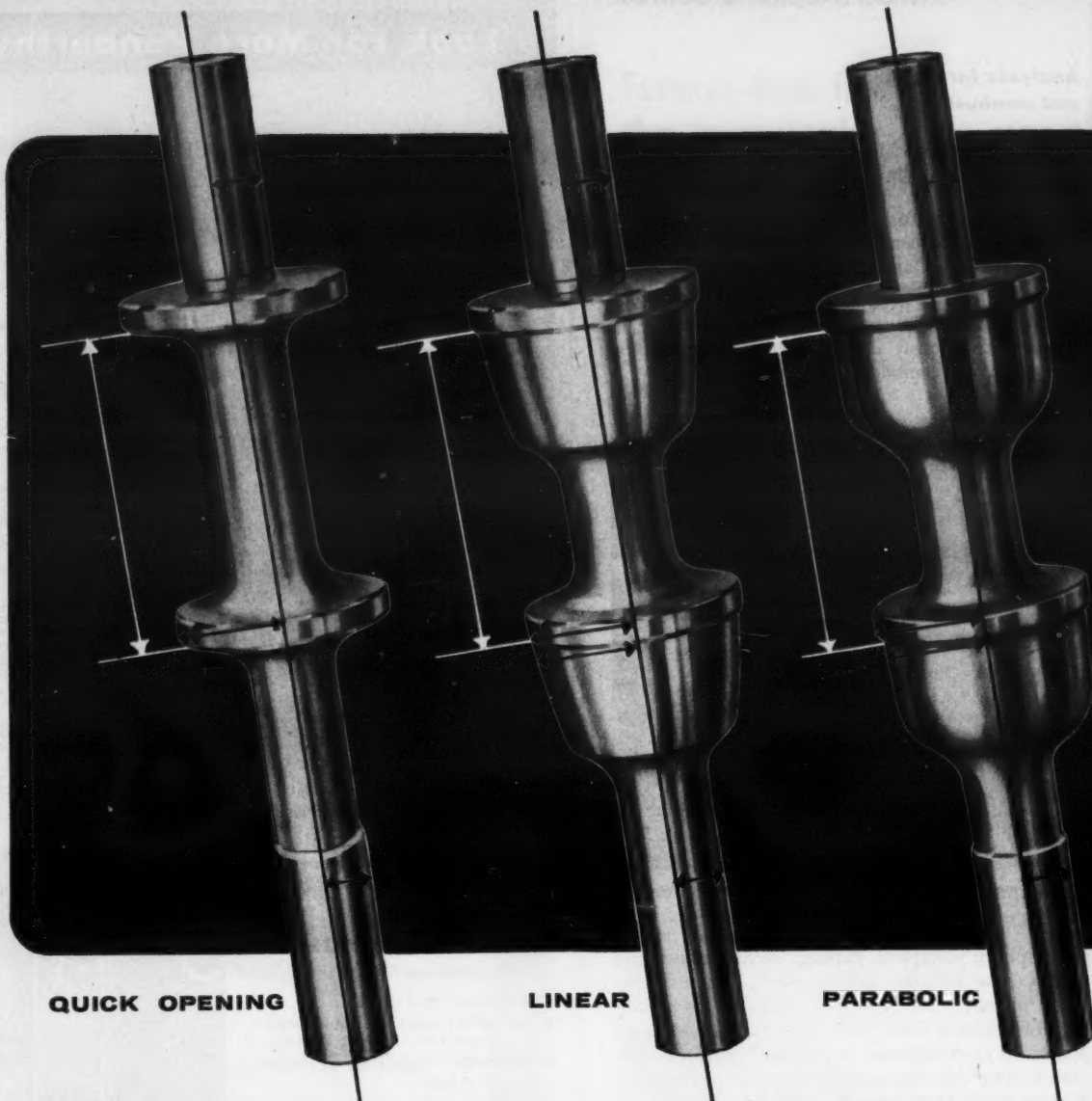
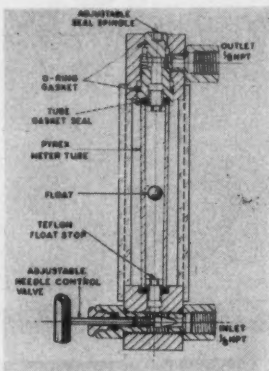
Features: Tapered metering tubes may be changed without removing instrument from the line. Tube is removed by loosening sealing plug a few turns and slipping tube out.

Description: Rotameter is designed for service at temperatures to 250°F with pressure ratings to 200 psi. (High-pressure units handle 400 psi at 100°F.) Side-plate construction takes up strains imposed by piping line. Side plates also provide protection against tube breakage.

Scale length of this purgometer is 2½". Separate scales for gas and liquid are color coded.

Standard scales are 0.2 to 2.0 cfh air at 14.7 psia and 0.5 to 4.0 gph for water. Interchangeability of tubes, however, permits a far wider range of readings. Eleven possible liquid metering scales have extremes of 0.01 and 20 gph.

(Sho-Rate "50" purgometer is a product of Brooks Rotameter Co., Dept. CP, Box 432, Lansdale, Pa. Check CP 3021 opposite last page.)



QUICK OPENING

LINEAR

PARABOLIC

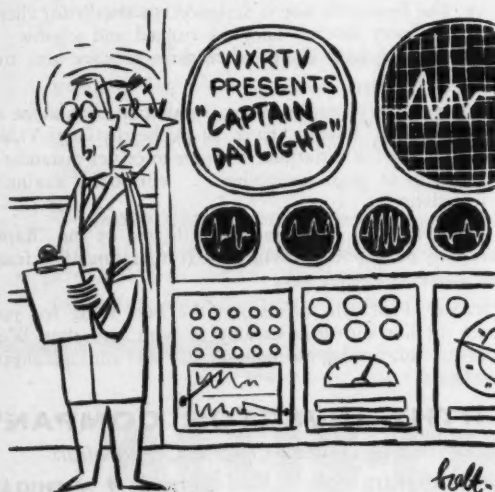
INTERCHANGEABLE PARTS

An Important Factor in Uniform Quality of Masoneilan Control Valves

You have a right to expect to be able to install replacement parts without recourse to a machine shop for custom fitting. When you use Masoneilan Control Valves you *get* parts that fit. For Mason-Neilan precision methods, automatic machines and specially designed

tools and gages, plus rigorous inspection, eliminate the maintenance man's headaches and reduce costly time out of service.

By maintaining this precise uniformity, Mason-Neilan makes certain that every valve will be in perfect alignment and that any



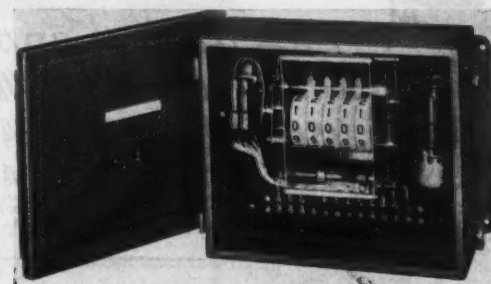
**Controls number of components
to be counted or measured
in batch or lot . . .**

can be set to ring bell or to stop machine
at pre-determined number

Uses: Counting number of items in a batch to
be handled or measured. Will count packages to
make up lot.

Features: Batch counter can be set to ring bell
or to stop process at pre-determined number or
count.

Description: Counter can be pre-set at any fig-
ure within range of 5 digits. At each impulse, one
digit is subtracted from the pre-set figure until
counter reaches zero. Counter then performs control



Counter can be pre-set at any figure containing up
to five digits

function, ringing bell and so forth. As further
impulses are received, counter *adds* one digit for
each impulse until it again reaches original pre-set
figure. Cycle is again repeated. Counter requires
no re-setting at the end of each cycle and will con-
tinue to operate indefinitely until pre-set figure is
changed. Unit is 5 x 10 x 12".

(Batch Counter is product of Spencer Mfg. Com-
pany, Dept. CP, 3253 N. Cicero Ave., Chicago 41,
Ill. . . . or for more information check CP 3023
on form opposite last page.)

**Contains application data
on limit switches**

In two colors, eight-page bulletin contains appli-
cation information on lever and rotating cam
limit switches. Typical applications include con-
trol of machinery travel, machine tool valves,
motor-operated doors and windows, safety inter-
locks on enclosing cases, automatic conveyors and
balers, and battery truck lift platforms. Ratings,
dimensions and prices are given.

GEA-6131A is issued by General Electric Co.,
Dept. CP, Schenectady 5, N. Y. When inquiring
specify CP 3024 on form opposite last page.

V-PORT

Concentricity maintained within
.0005" at points indicated insures
accurate fit and alignment.

parts you may install later will also be in per-
fect alignment.

Moreover, because valve plugs of com-
parable size but different flow characteristics
are interchangeable, conversion is a com-
paratively simple operation.

These quality features,



MASON-NEILAN REGULATOR CO.

1203 ADAMS STREET, BOSTON 24, MASS., U. S. A.

Sales Offices or Distributors in the Following Cities: New York • Syracuse • Chicago • St. Louis • Tulsa
Philadelphia • Houston • Pittsburgh • Atlanta • Cleveland • Cincinnati • Detroit • San Francisco
Boise • Louisville • Salt Lake City • El Paso • Albuquerque • Odessa • Charlotte • Los Angeles
Corpus Christi • Denver • Appleton • Birmingham • New Orleans • Dallas • Seattle
Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

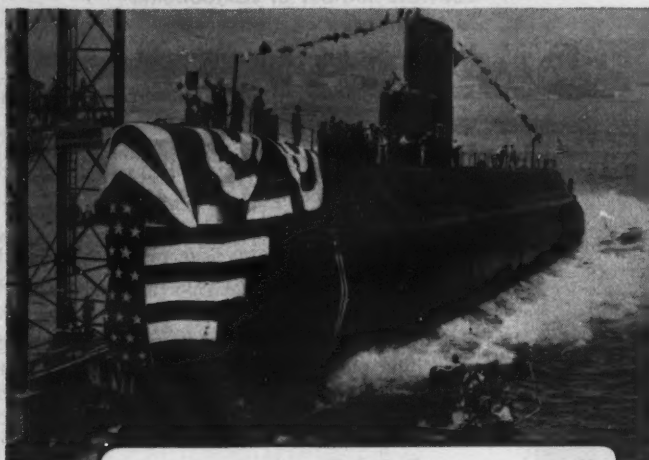
added to other outstanding qualities of
Masoneilan Control Valves, offer you low
cost at comparable *price* — and over-all cost
not price is the valid comparison.

Investigate the practical advantages of
Masoneilan Control Valves.

Write for complete data.

When inquiring check CP 3022 opposite last page

The "Ceramo" thermocouples to be used to measure temperatures for evaluation of efficiency and safety of the "Seawolf's" atomic reactors have Stainless Steel sheaths and Chromel-Alumel thermocouple wires.



T-E'S NEW "Ceramo" THERMOCOUPLES WILL BE USED TO CHECK REACTOR TEMPERATURES ON ATOMIC SUB "SEAWOLF."

Where the conditions are the toughest—where heat, corrosion and radiation have made it difficult to write a specification—you can depend on finding "Ceramo" thermocouples. The "Ceramo" sensing element of this new Thermo Electric thermocouple consists of a metal sheath, protecting two thermocouple wire conductors which are separated and firmly fixed in place by ceramic insulation.

Although this thermocouple is rugged enough to stand pressures of several thousand p.s.i. and temperatures to 1600° F., it may be bent to any configuration. "Ceramo" thermocouple extension wire is also available, in all standard thermocouple materials ... comes in sizes from 1/16" to 1/4" diameter.

Get all the latest information on these new metal-clad, ceramic-insulated wires and thermocouples. Write for Bulletin 31-300-R.



*Photo Courtesy Electric Boat Division of General Dynamics Corp. and U.S. Navy

Pyrometers • Temperature Monitoring Systems • Thermocouples • Protection Tubes
Quick-Coupling Connectors and Panels • Thermocouple and Extension Wires

Thermo Electric Co., Inc.
Rochelle Park Post Office, SADDLE BROOK, NEW JERSEY
IN CANADA—THERMO ELECTRIC (Canada) Ltd., BRAMPTON, ONTARIO

When inquiring check CP 3025 opposite last page

INSTRUMENTATION

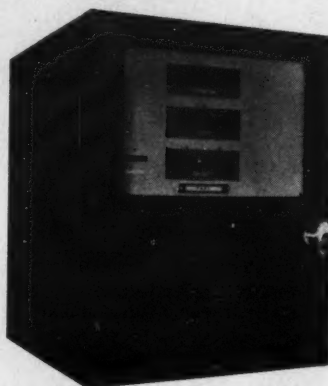
Production analyzer of sheet materials shows rejects . . .

reports according to five weights or thicknesses

Uses: Reporting and analyzing production of plastic sheeting, paper.

Features: Unit shows amount of premium material, rejects and process down-time.

Description: Total production is divided into five weight or thickness classifications. Center of "Good" classification is



Production is reported as "Premium", "Good" or "Reject"

placed on product specification. Counters show amount of acceptable material broken down into material under and over (minus and plus) product specification. Two counters show reject material, under and over (minus and plus) product specification. This classification is set up so any material outside extreme limits of "Good" will be totalled as "Rejects".

Downtime counter reads in tenths of minutes and may record any process condition desired. Units of measurement are feet or yards, or multiples. Unit is designed to operate over wide range of process speeds.

(Production analyzer is product of Industrial Nucleonics Corp., Dept. CP, 1205 Chesapeake Ave., Columbia 12, Ohio. Check CP 3026 opposite last page.)



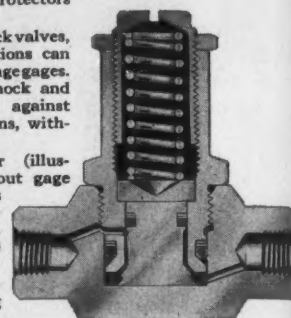
SAFEGUARD YOUR GAGES WITH REPUBLIC PROTECTORS

PROTECT your expensive gages from damage with Republic Gage Protectors and Pressure Snubbers.

Fluid hammer, chattering check valves, and severe pressure fluctuations can cause extreme shock, and damage gages. Pressure Snubbers absorb shock and permanently protect gages against damage from wild fluctuations, without affecting accuracy.

Adjustable Gage Protector (illustrated) automatically cuts out gage when system pressure rises above gage range, and reopens when pressure drops. Working pressures to 10,000 psi.

Ask for Gage Protector Bulletin No. 554, or new catalog No. 654 showing entire line.



Distributors in principal cities coast to coast.



RM REPUBLIC MANUFACTURING CO.
15655 BROOKPARK ROAD • CLEVELAND 11, OHIO

When inquiring check CP 3027 opposite last page

SEE INSIDE YOUR FLUID LINES WITH THE NEW LIQUID EYE®



3000 series features:

- High pressure Pyrex sight glass.
- Pressure-sealed Neoprene sealing rings at both ends.
- Withstands operating pressures of 600 psi. and temperatures of 300° F. continuously.
- Unrestricted full line flow.
- Ruggedly constructed of cadmium plated steel.*
- Ideal for wide variety of applications.

*Can be furnished in stainless steel on special order. Standard sizes — 3/4", 1" and 1-1/4" i.p.s. and 1/4" thru 1-1/4" tube sizes.

You'll find there's a "LIQUID EYE" designed to fit your application, too. An Allin representative is ready to help you choose from a most complete line of Liquid Eyes, or work with you on any special design. Send for Catalog D-55 covering the complete Allin line.

Allin MANUFACTURING COMPANY
1153 W. Grand Ave., Chicago 22, Ill.

When inquiring check CP 3028 opposite last page

CHEMICAL PROCESSING

**Will meter purge flows
to 1500 psi, 400°F...**

armored purge meter has all-metal construction
—uses magnet and follower to indicate flow rate

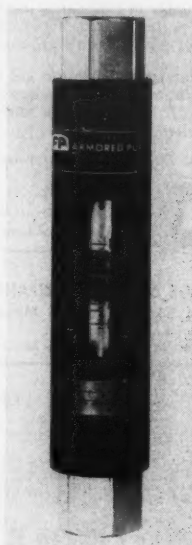
Uses: For metering any purge fluid in chemical or processing installations.

Features: Armored purge meter has 1500 psi ASA pressure rating. Temperature rating is to 400°F.

Description: Meter has all-metal construction. Magnet and follower are used to indicate flow rate. Operation of meter is restored easily should violent line surge cause magnet to be lost. Magnetic attraction is strong enough to reposition magnet if head valve is closed momentarily.

Purge meter comes in two stock sizes: 25 gph water or 103 scfh of free air, and 80 gph or 330 scfh of free air equivalent. These meters are not recommended for gas service below 60 psig. A 1/2" Hoke needle valve suitable for 3000 psi can be furnished.

Unit is 7 1/2" long with 1 7/16" outer diameter and connection size of 1/2" NPT. Scale graduation is 0 to 100% in 10% increments. All parts in contact with liquids are 316 stainless steel.



Armoured purge meter uses magnet and follower to indicate flow rate

(Figure 245 Purge Meter is product of Fischer & Porter Company, Dept. CP, 48 Jacksonville Road, Hatboro, Penna. . . or for more information check CP 3029 on form opposite last page.)

**Temp, pressure transmitters
detailed in catalog**

Temperature and pressure transducers are illustrated and described in 12-page catalog made up of individual bulletins. In each case, critical constants, ranges, and other specifications are included. Engineering drawings, photographs, and sketches are used to show sizes and method of operation.

Buls MPT-1 *et al* are issued by Statham Laboratories, Inc., Dept. CP, 12401 W. Olympic Blvd., Los Angeles 64, Calif. When inquiring specify CP 3030 on form opposite last page.

NOW! Downhill metering!

the new
MILTON ROY
-ΔP PUMP
(MINUS DELTA P)

In operation, the four-way valve admits fluid to one side of the pump chamber, forcing a slack diaphragm to displace fluid from the opposite pump chamber. This procedure reverses on the next cycle. The pacing valve can be operated manually, mechanically, electrically, or pneumatically.

FEATURES

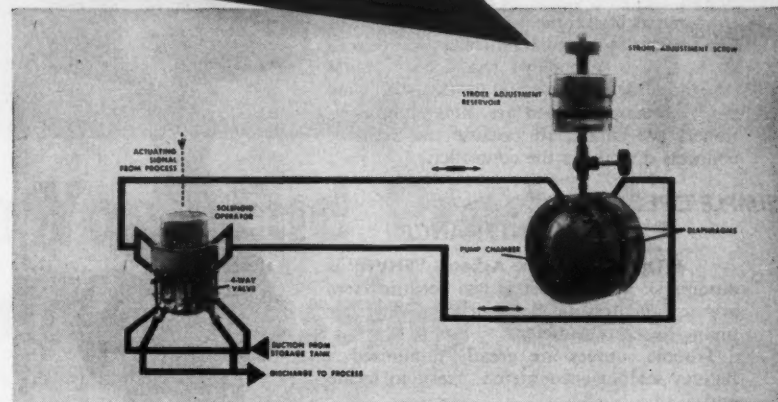
- Leakproof
- No stuffing box
- No running seal
- No contamination
- No lubrication
- Accuracy within
plus or minus 1%
- Easily dismantled

LITERATURE

For complete details write today for *Bulletin 855!* Milton Roy Company, Manufacturing Engineers, 1300 East Mermaid Lane, Philadelphia 18, Pa.

**TELL US
YOUR PROBLEM**

Milton Roy engineers will gladly analyze your operation and advise you of the ways "downhill metering" might be applied in solving your particular pumping problem. Write us today.



Downhill metering (controlled volume pumping from higher to lower pressures) is now practical. The -ΔP pump uses a new concept in controlled volume pumping to meter clear fluids (liquids or gases) wherever suction pressure is at least 5 psi greater than discharge pressure.

External power sources are often unnecessary since the -ΔP pump can use the potential energy of the

fluid (stored either under pressure or in an elevated location). The basic leakproof diaphragm design (for both meter and pacing valve) and a wide selection of materials of construction make the -ΔP pump particularly adaptable to handle corrosive or hazardous fluids. For specification data, write for Bulletin 855 . . . to Milton Roy Co., 1300 E. Mermaid Lane, Phila. 18, Pa.

Engineering representatives in the United States, Canada, Mexico, Europe, Asia, South America, and Africa.



When inquiring check CP 3031 opposite last page

FOUND-

the MISSING LINK

in electronic control... the electro-hydraulic FINAL CONTROL element

NEW ASKANIA ELECTRO-HYDRAULIC VALVE ACTUATOR IS CONTINUOUS-ACTING, DEPENDABLE

• Here's a new valve actuator which makes remote electrical operation of the final control element a reality for the first time. Adaptable to practically all electronic controllers, it produces an accurate, dependable heavy duty action capable of delivering a 600 lb. thrust to slide stem valves up to 8 inch size. Relays and positioners are eliminated because the actuator connects directly to the controller.

SIMPLE OPERATION... EASY MAINTENANCE

• Operation of the Askania "EHVA" is automatic. Maintenance is less because there are no compressors, dehumidifiers, filters or piping to create trouble.

Trouble sources are greatly minimized... failures seldom encountered... easy to locate and rectify.

ELIMINATES WEATHER FACTOR

• Electrical operation means no inconvenience or failure from condensation or freezing. Trouble free operation under any conditions... indoors or out, winter or summer... is assured—all the way to the final control element with Askania's Electro-Hydraulic Valve Actuator.

Check These Facts: Permits all Electric Control Throughout the System • Weatherproof Performance • Simple to Install—and Operate • Continuously responsive to small signal changes • Accurate Valve Positioning Assured by Force Balance Principle.

FEATURES: Valve Stem Speed... 0.5 in/sec Valve Stem Thrust... 600 lbs.
Valve Stem Stroke... 1/2 to 2 inches
Input Coil Resistance... 3,000-18,000 ohms
Input Signal... approx. 75 milliwatts d.c.

Write for Bulletin No. 200 for complete information on how "EHVA" control might be adapted to your control system.

CONTROLS FOR INDUSTRY

ASKANIA REGULATOR COMPANY

242 East Ontario Street, Chicago, Illinois

HYDRAULIC, ELECTRONIC CONTROLS & SERVOS, GENERAL SYSTEMS,
ENGINEERING & COMPUTER SERVICE, VALVE ACTUATORS & CYLINDERS

A Subsidiary of General Precision Equipment Corporation

When inquiring check CP 3032 opposite last page

INSTRUMENTATION

Uses radio frequency
to find one part
in 700,000 . . .

mass spectrometer leak detector has plug-in chassis

Uses: Leak detector provides both audible and visible warning for air leaks in high-vacuum systems.

Features: Use of plug-in chassis simplifies maintenance and cuts downtime.

Description: Mass spectrometer employs radio frequency to



Compact design embodies a counter-top working space

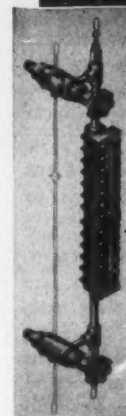
achieve good accuracy in leak detection with a compact unit. Design provides working space on counter top of cabinet.

(More information about Spectrometer is contained in Bul 416 available from Beckman Div., Beckman Instruments, Inc., Dept. CP, Fullerton 1, Calif. . . . or check CP 3033 opposite last page.)

Instruments needed?

Check the convenient product directory which starts on page 178 in this issue

get accurate level readings of hot or cold liquids



Reflex Type,
Internal Tube
Model

. . . with Jerguson Heated and Cooled Gages

Jerguson Heated and Cooled Gages are the answer if you have the problem of getting accurate level readings of liquids that boil or surge . . . or liquids that are heavy and don't flow at normal temperature.

These gages are specially designed and built to carry a cooling circulating medium to control boiling tendencies . . . or a heating circulating medium to speed the flow . . . so you get accurate readings. Available in external or internal tube models, reflex or transparent types, in a large number of sizes and pressure groups.

Jerguson's high standards of design are followed throughout; and materials are selected to exceed or conform to A.I.S.I., A.S.T.M. and/or A.P.I.-A.S.M.E. requirements.

Send for detailed Data Unit and full information.

Gages and Valves
for the Observation
of Liquids and Levels

JERGUSON

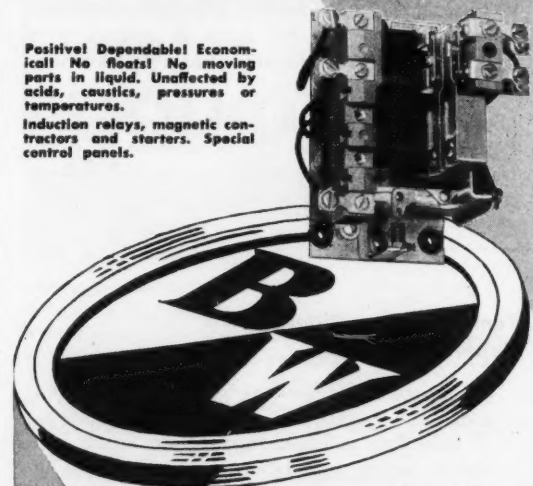
JERGUSON GAGE & VALVE COMPANY
100 Fellsway, Somerville 45, Mass.

Offices in Major Cities. In Canada: Peacock Bros. Ltd.
In England: Jerguson Tress Gage & Valve Co. In France: Pétrole Service

When inquiring check CP 3034 opposite last page

LIQUID LEVEL and INDUSTRIAL CONTROLS

Positive! Dependable! Economical! No floats! No moving parts in liquid. Unaffected by acids, caustics, pressures or temperatures. Induction relays, magnetic contractors and starters. Special control panels.



WRITE FOR COMPLETE CATALOG

B/W CONTROLLER CORPORATION

2204 E. MAPLE ROAD BIRMINGHAM, MICH

FIRST IN THE FLOATLESS CONTROL FIELD

When inquiring check CP 3035 opposite last page

CHEMICAL PROCESSING

**Get indefinite service life
by replacing usual
rectifier tubes . . .**

plug-in silicon units require no filament voltage; have no warm-up period

Uses: Supplying DC for electronic control and instrument systems.

Features: Silicon rectifier units have indefinite service life and directly replace conventional rectifier vacuum tubes — octal socket connections are identical with interchangeable vacuum tubes.

Description: Plug-in rectifiers require no filament voltage and consequently have no warm-up



Silicon rectifier units directly replace conventional rectifier tubes

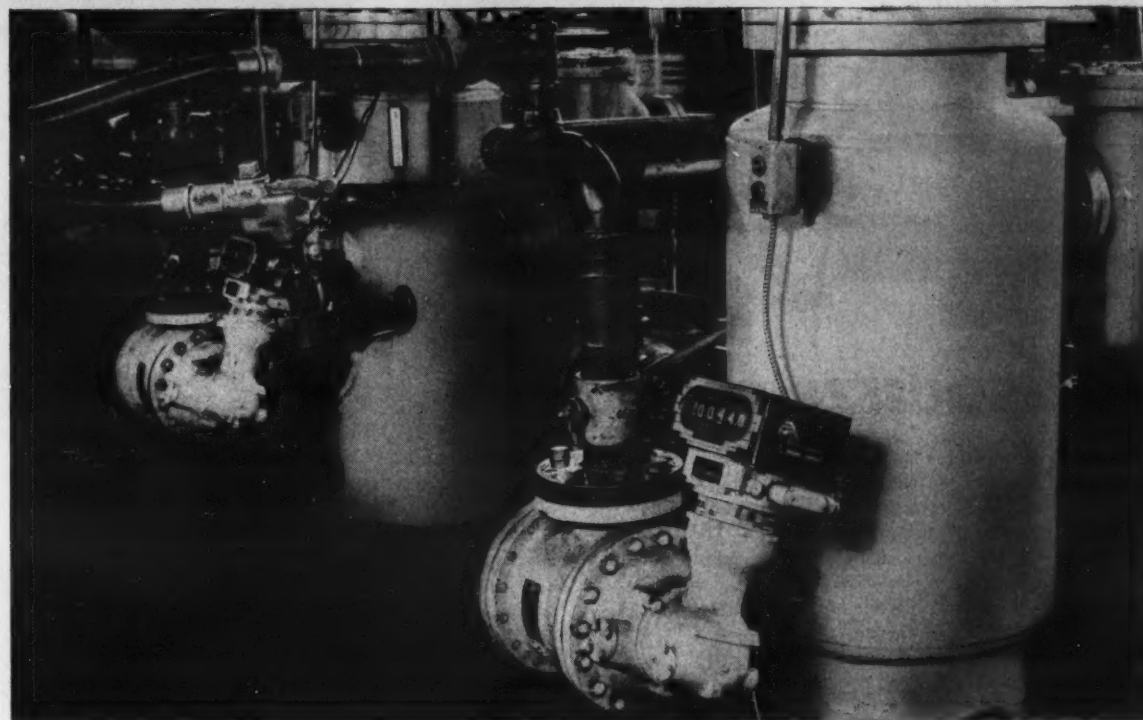
time. Heat dissipation is reduced to minimum. Input and output voltages remain the same as conventional rectifier vacuum tubes. Silicon rectifier units function under conditions of high ambient temperatures, withstand easily-damaging effects of shock and vibration.

(Plug-in Silicon Rectifiers are products of Bogue Electric Mfg. Co., Dept. CP, 52 Iowa Ave., Paterson 3, N. J. Check CP 3036 opposite last page.)

**Discusses AC potentiometer
for servo systems**

Four-page booklet describes 400-cycle AC potentiometer and variable transformer. Design principle is illustrated with schematic drawings. Unit was designed for use in servo systems and analog computers.

"Vernistat" is issued by Vernistat Div., The Perkin-Elmer Corp., Dept. CP, Norwalk, Conn. Specify CP 3037 opposite last page.



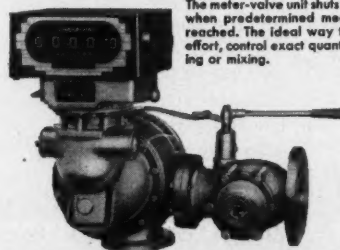
Improve Your End Product, Cut Liquid Processing Costs

ROCKWELL INDUSTRIAL METERS

Give Accurate Measurements—Fast!

Durable, All-Metal Construction In
STAINLESS STEEL BRONZE ALL-FERROUS STEEL
CLIP COUPON—MAIL TODAY

Automatic Quantity Control



Provides Pre-Set Meter Shut-off Without Shock!

The meter-valve unit shuts off automatically when predetermined measured volume is reached. The ideal way to save time and effort, control exact quantities when batching or mixing.

ROCKWELL MANUFACTURING COMPANY
Pittsburgh 8, Pennsylvania

106A

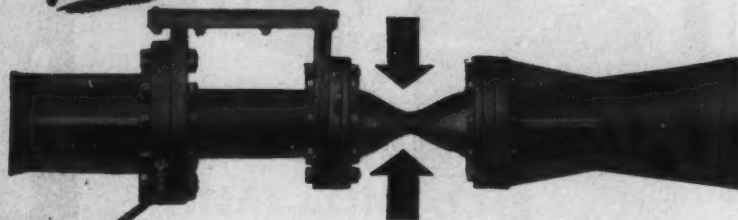
Gentlemen:

I am interested in measuring _____
Pipe Size _____ (Name of Liquid)
Working Pressure _____ psi Temperature _____ °F max.
Max. Flow Rate _____ gpm Min. Flow Rate _____ gpm
Your Name _____
Company _____
Street _____
City _____ Zone _____ State _____



When inquiring check CP 3038 opposite last page

New! SIMPLEX



SQUEEZE CONTROLLER

Accurately regulates flow of liquids containing suspended solids or trade wastes—with no effect on moving parts!

A Simplex venturi tube, the most accurate form of primary device, does double duty—measures as it controls.

Special throat section is flexible rubber. If flow tends to change, motor-

driven clamping device adjusts throat area—quickly returns flow to control point.

Throat section is self-scouring. Viscous fluids contact no moving parts.

Write for full details today!

Simplex Valve & Meter Company, Dept. CP-1
7 E. Orange St., Lancaster, Pa.

IT'S SIMPLEX
IT'S ACCURATE

SIMPLEX®
VALVE AND METER COMPANY

When inquiring check CP 3039 opposite last page

***JAN. 5, 1950**

That's 6 years ago, Mister. The SCRAYCO LEVEL CONTROL which was installed then (our first) to control the flow of wood dust in a bin has worked every day since, often three shifts.

Nothing amazing for SCRAYCO. We have instruments working trouble-free in control of lead, coal, industrial dust, rock, etc. Some regular size particles, some varied. Some dry, some sticky; many flammable. Large customers have bought one SCRAYCO, then a dozen.

*Which means one thing --- they like SCRAYCO. If you're fed up with process delays due to clogging and fouling of your present level control (so-called) you'd better investigate a SCRAYCO. It does the job.

For literature write or wire.



SCRAYCO
MANUFACTURING CO.
BOUND BROOK, N. J.

When inquiring check CP 3040 opposite last page

INSTRUMENTATION

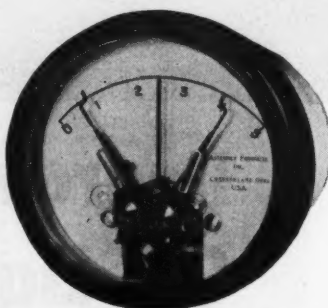
**Adjustable meter-relay
has shock-mounting
for ruggedness...**

control is front-adjusted
to any point on scale

Uses: Limit-control of process operations according to pre-determined limits of temperature, pressure, other variables measured electrically.

Features: Instrument is shock-mounted internally and case is sealed for ruggedness.

Description: Sensitivity ranges from 0/20 μ a to 0/50 amp, or 0/5 mv to 0/500 v. Rectifiers are used for AC. Higher ranges



Control limits are set by screws
in front

require external shunts or multipliers. Contacts can be front-set for operation from full scale down to within 1% of zero point—double contacts to 2% minimum spacing.

Meter accuracy is 2%. Contact repeatability is 1%. Instrument is interchangeable with regular 2 1/2" round case meter and fits in panels drilled for JAN or MIL specification meters of that size. Contacts are platinum alloy and have a life over ten million operations. One contact is on meter-pointer. Two other contacts are on limit pointers. Contact ratings are 5-25 ma, 75-125v DC. Other ratings can be supplied.

(Model 255-C meter-relay is product of Assembly Products, Inc., Dept. CP, Chesterland, Ohio. Check CP 3041 opposite last page.)

CAMBRIDGE SURFACE PYROMETERS

In many industries close temperature tolerances demand continuous accurate knowledge of the temperature of working surfaces. To meet this requirement, Cambridge Surface Pyrometers have proved themselves to thousands of plants throughout the world.



CAMBRIDGE INSTRUMENT COMPANY, INC.
Pioneer Manufacturers of Precision Instruments
Grand Central Terminal New York 17, N. Y.

Cambridge Surface Pyrometers are light weight, portable instruments—accurate but rugged—for measuring temperature of mold cavities and flat surfaces, still or moving rolls, and within-the-mass temperature of materials in a plastic or semi-plastic state. Write for Bulletin 194-SA; 33 illustrations, many applications.

CAMBRIDGE INSTRUMENT CO., INC.

3512 Grand Central Terminal, New York 17

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

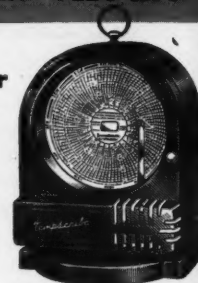
When inquiring check CP 3042 opposite last page

Instruments for Measuring AIR TEMPERATURE and VELOCITY

TEMPSCRIBE Recording Thermometer

Available in 10 different ranges to cover -30°F to +100°F temperatures, and with spring-operated chart drives for any of the following chart rotations: 6 hours, 24 hours or 7 days.

This entirely self-contained, compact and reliable temperature recorder automatically writes a continuous record of temperature changes on a replaceable chart. Record shows at a glance maximum and minimum temperatures and the duration of temperatures above or below any given point; also shows the exact time of every temperature change and how rapidly it takes place. Recording pen and bi-metallic element are built in hinged, removable door which is also front of instrument. Thus, by merely changing doors it is easy to interchange temperature ranges. Instrument is 8" tall, 5 1/2" wide and 4 1/2" deep. Charts are 4 1/2" inches in diameter.



Write for Bulletin I-715

FLORITE Anemometer

In principle, this unique instrument operates as an anemometer but provides instantaneous, direct readings of air velocity without timing, calculations or reference to charts. Readings are obtained by holding the instrument in the air stream so that air blows against its circular face, causing rotation of a multi-blade rotor mounted in instrument housing. The circular scale surrounding the rotor instantly turns to correct air velocity reading under an index pointer on scale window. Furnished with detachable handle (not shown) and leather case.



Available in two styles: One with a scale of 0-1000 ft./min., and the other with a scale of 0-3000 ft./min.

TF-51

Write for Bulletin I-760
BACHARACH Industrial Instrument Co.
7301 PENN AVENUE • PITTSBURGH 8, PA.

When inquiring check CP 3043 opposite last page

CHEMICAL PROCESSING

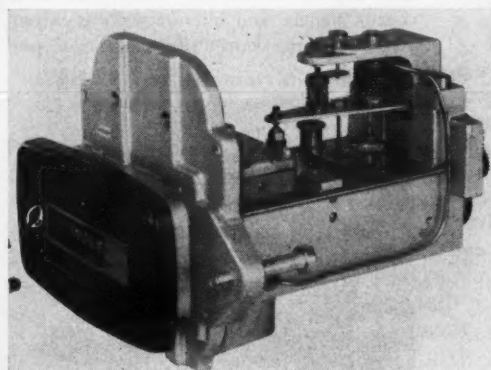
**Provides linear integration
of process flows
to within 1/2 % . . .**

camless pneumatic integrator uses centrifugal force to cancel differential pressure factor

Uses: Providing continuous linear integration of industrial process flows.

Features: Integrator requires no cams for square root extraction and has within 1/2% accuracy.

Description: Unit receives a 3-15 psi signal of differential pressure measurement from flow transmitter. Signal is applied to a bellows to position a flapper in relation to a nozzle. Back pressure of nozzle, amplified by an air relay, directs a jet of air onto blades of turbine wheel. Centrifugal



Pneumatic signal of 3-15 psi is applied to bellows to position flapper in relation to nozzle

force of spinning wheel exerts a counter force on flapper to arrive at a balance of forces. Counter force is exerted through a flexure strip and axial shaft. Turbine wheel is geared to a counter to totalize flow.

(Model 14A pneumatic integrator is product of The Foxboro Company, Dept. CP, 48 Jacksonville Rd., Foxboro, Mass. . . . or for more information check CP 3044 on form opposite last page.)

**Catalogs over 26,000
electronic parts**

Listing over 26,000 items, 324-page catalog includes prices and descriptions on electronic parts. Booklet emphasizes equipment for industrial maintenance, research and production requirements. There are detailed listings of standard and special-purpose electronic tube test instruments, circuit components.

1956 Catalog is issued by Allied Radio Corp., Dept. CP, 100 N. Western Ave., Chicago 80, Ill. Specify CP 3045 opposite last page.

wherever precise flow
measurement is critical . . .

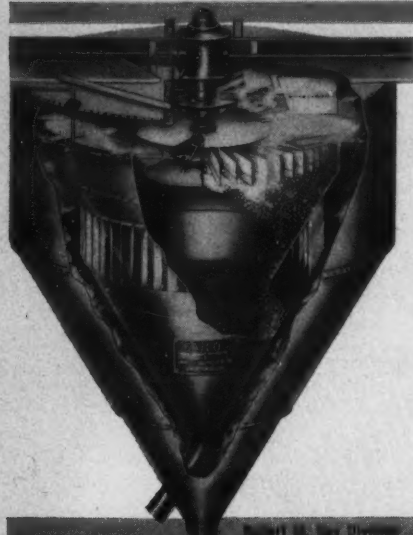
Potter TURBINE TYPE FLOWMETER

ACCURATE, DEPENDABLE POTTER FLOWMETERS are being specified by more and more chemical processors each year for jobs that demand high reliability, high precision, low maintenance, extreme control precision. Available in sizes from 1/8" to 6" units, they measure caustics, acids, corrosives, unstable compounds, suspensions, super-refined liquids and other hard-to-handle liquids at temperatures up to 1200°F. and at pressures to 35,000 psi. Easily incorporated into complex control systems because of their linear output, Potter sensing units produce a signal that can be telemetered, fed into digital information handling systems, or measured directly to indicate or control flow rate or total flow. Find out how this unique approach to flow measurement can help solve your flow-control problems. Write for Bulletin S-1.

POTTER AERONAUTICAL COMPANY • Route 22 • Union, N. J. • Phone MUrdock 6-3010
Makers of "Potter Engineered" products

When inquiring check CP 3046 opposite last page

**USING SCREEN SEPARATIONS?
NOTHING CLASSIFIES AS
PERFECTLY AS AIR**



GAYCO

CENTRIFUGAL AIR SEPARATORS

Classify practically all
dry fine materials

You get:

- CLOSER SEPARATIONS
- IMPROVED PRODUCTION
— fines removed as they
are made.
- NO UNDESIRABLE
OVERSIZE.

RANGE 60 to 400 mesh.
Timken bearings.
Choice of Standard or
Heavy Duty Models.

Send now for Catalogue
and Studies in separating
of various materials.

UNIVERSAL ROAD MACHINERY CO.

117 Liberty St., New York 6, N. Y.

Factory and Laboratory: Kingston, N. Y.

Authorized U. S. Distributor: E. C. Mendenhall

When inquiring check CP 3047 opposite last page

Stepless temperature Control

NOW! TUBELESS, MULTI-LOAD

Improved Model JS Series **GUARDSMAN**
Stepless Controllers by WEST. One
Instrument Handles a Range of Wattage
Requirements.



- ★ Closest Control
- ★ Save power
- ★ Prolong Heater Life
- ★ Adjustable Band

- ★ Manual Reset
- ★ Simplest Operation —
One Knob
- ★ Least Maintenance

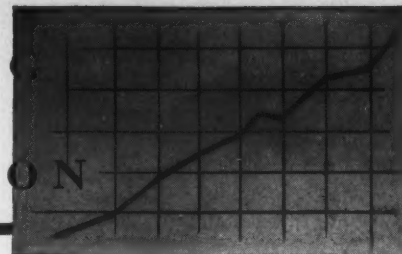
Without tubes or relays, this unique
instrument modulates input to suit de-
mand. Proved in wide use. Write for
Bulletin JS.

**4357C Montrose Ave.
Chicago 41, Illinois**

When inquiring check CP 3048 opposite last page

WEST Instrument
CORPORATION
CHICAGO
SALES OFFICES IN PRINCIPAL CITIES

EXPANDING CHEMICAL PRODUCTION

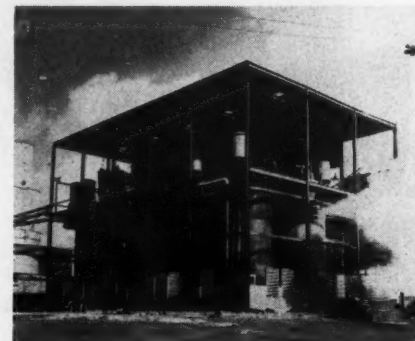


New Martinsville Mobay plant goes on stream

First production units of Mobay Chemical Company's multi-million dollar plant at New Martinsville, W. Va., went on stream during November. Balance of the plant was placed in production in December. Products are isocyanate chemicals for production of urethane. Construction of the plant was started in January, 1955. Urethane, produced commercially in Germany for more than five years, is used for both rigid and flexible foams, paints, wire coatings, adhesives, synthetic rubber materials. Mobay Chemical Company was formed in 1954 by Monsanto Chemical Company and Farbenfabriken Bayer, A. G.

Gets fermenter into production — builds plant around it

Grain Processing Corporation has started operation of a new pure culture fermentation plant at Muscatine, Iowa, although construction of outside walls, permanent control panels, and interior walls is incomplete. Pressing demand for additional pro-



Ziegler-type polyethylene for West Coast

Chemical Division of Koppers Company, Inc., and Brea Chemicals, Inc., subsidiary of Union Oil Co. of California, plan a joint venture to construct and operate a Ziegler-type polyethylene plant on the Pacific Coast. Process designs for the multi-million-dollar plant which will have a capacity to produce 50 million lb/year, are being prepared by Koppers Company. A joint engineering team is presently resolving details concerned with location and operation. Schedule calls for 1957 completion.

duction required construction so that operation could begin before the building was finished. Production was started almost two months earlier than would have been otherwise possible. Plant is making USP riboflavin, riboflavin feed supplement, vitamin B₁₂ feed supplement, and saccharifying enzymes.

More plastic foam plants

... will be built by Dow Chemical Company. One of two new plants will be located near Ironton, Ohio, on the Ohio River, and will be known as the Hanging Rock Plant. Second will be the Riverside Plant at Riverside, Mo., 25 miles south of St. Louis. Completion of both units is scheduled for fall of 1956. Product is called "Styrofoam". It is used as insulation for cold storage purposes and as perimeter and plaster-base insulation in masonry-constructed homes.

Lithium hydride demands up — capacity boosted

Immediate expansion of the Metal Division of Lithium Corp. of America, Inc., at Minneapolis, Minn., has been required by contract demand for lithium metal and lithium hydride in 1956. The plant at St. Louis Park uses an electrolytic process.

**News about chemical materials in the US —
plant construction, increased production . . .
on stream now or planned for future**

**Half million dollar program
for industrial cleaners**

Puritan Chemical Company of Atlanta, Georgia, plans half million dollar building program for manufacturing and storage facilities. First part of the program will be completed by September, 1956. Expansion will be adjacent to Puritan's present facilities. Puritan manufactures industrial cleaners, deodorants, disinfectants.

**World's first commercial plant
for isosebacic acid**

More than three years of research and two years of pilot plant operation are paying off for US Industrial Chemicals Company, who is building the first commercial plant in the world for production of isomers of sebacic acid. Initial production capacity will be 10 million lb/year. Completion is scheduled for early 1957. During the past two years "USI Isebacic" acid has been produced in a Cincinnati pilot plant. The pilot plant will continue to operate to supply samples and to develop further process refinements until the new plant at Tuscola, Illinois, comes on stream.

Applications of the material include: production of polyamide (nylon type); molding and extrusion plastics and adhesives; alkyd resin manufacture; synthesis of ester lubricants; production of polyester resins; synthesis of polyurethane resins.

Production process for isosebacic acid uses butadiene and sodium. Tuscola was chosen as location for plant because of availability of raw materials.

— More expansion at Tuscola

. . . has been completed by US Industrial Chemicals Company, Div. of National Distillers Products Corporation. A Girdler reforming unit to produce hydrogen from natural gas will help supply the 150 ton/day ammonia plant. Also, a combination alcohol denaturing plant, bonded warehouse, and solvent distribution point has been added.

Capacity will be 12 million gallons per year.

USI has also added a combination alcohol denaturing plant, warehouse, and solvent distribution unit at Newark, N. J. Newark plant has a 10-million gallon per year capacity and is specially designed to handle a large tank truck volume.

**Will use continuous process
to treat soap skimmings**

Multi-million-dollar chemical plant will be constructed by Glidden Company at Port St. Joe, Florida, to use crude soap skimmings, by-product of St. Joe Paper Co. and other southern kraft mills. Plant will produce crude and distilled tall oil, high-grade fatty acids, premium-grade tall oil rosins, and by-product pitch. Plant will use continuous process for treatment of soap skimmings which has been developed by Glidden researchers. Capacity will be 50,000 tons annually of the soap skimmings.

Glidden's Port St. Joe unit will be the second major step in expansion program of the Southern Chemical Division. It will be the fourth chemical plant operated by Glidden in the deep South.

**Du Pont expanding PV acetate
and synthetic rubber**

Du Pont is spending 550 thousand dollars to increase capacity for producing polyvinyl acetate emulsion at its plant in Niagara Falls, New York. Work on expansion has already been started and is expected to be completed by end of 1956. Product is used in manufacture of adhesives for paper products, in textile finishes, as binder for non-woven fabrics, and in grease-resistant paper coatings and sizes.

Du Pont is also planning to construct production facilities at Beaumont, Texas, for synthetic rubber, Hypalon, a chlorosulfonated polyethylene developed by Du Pont research. New production facilities are scheduled for completion during the first part of 1957.

Bulk Chemical Storage by the SAUERMAN Method



Potash Recovery at Carlsbad

**How
Sauerman Scraper
Storage
Reduces Costs**



Remote Control

This prominent producer of basic chemicals uses Sauerman 1½-cu. yd. Scraper Machines to reclaim potash at 200 tph. Total area covered is approximately 125 by 370 ft. Building capacity is 60,000 tons.

Here's how a Sauerman Machine cuts costs:

One operator, located in a safe station overseeing the entire area, can recover practically 100% of all stockpiled material.

All highly machined parts, hoists and motors can be located outside of the building and protected from corrosion and dust.

When parts are replaced—sheaves, clutch or brake linings—the machine is restored to practically new condition, even though it may be twenty or more years old.

Only the Crescent scraper and cables contact the material. The scraper machine can be designed to operate the scraper on top of non-caving material. This allows the scraper to break down any high faces that may be standing.

Sauerman Storage Machines are built for hourly capacities of from 20 to 600 cu. yds. A partial list of chemical producers and manufacturers using some type of Sauerman equipment includes:

Consumers Cooperative Assn.
Crawford Chemical Co.
Davison Chemical Co.
Division of W. R. Grace & Co.
Duval Sulphur & Potash Co.
F. S. Royster Guano Co.

International Minerals & Chemical Corp.
Lion Oil Co.
Potash Company of America
Tennessee Farmers Cooperative
Virginia-Caroline Chemical Corp.

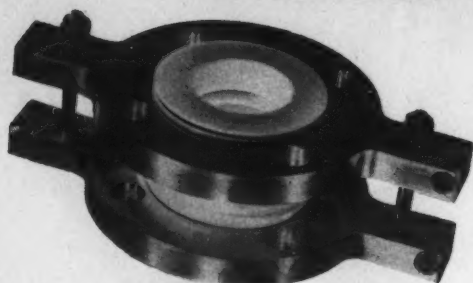
For ways to reduce your material handling costs, write to Sauerman's experienced engineers. Request Catalog E, *Bulk Storage by Scraper*, plus Field Report 227 and other reports on the handling of your material by Sauerman Machines.

SAUERMAN BROS. INC. 624 S. 28th Ave. • Bellwood, Illinois

When inquiring check CP 3049 opposite last page

NEW

Steel Flanged
TEFLON
Bellows
by *Doré*



This new style E-8F Flanged TEFLON Bellows has a multiplicity of advantages over conventional types. It overcomes incorrect flanges, the principal cause of bellows failure. The design and construction of this new style E-8F bellows, developed by Doré, is furnished at no additional cost over present prices.

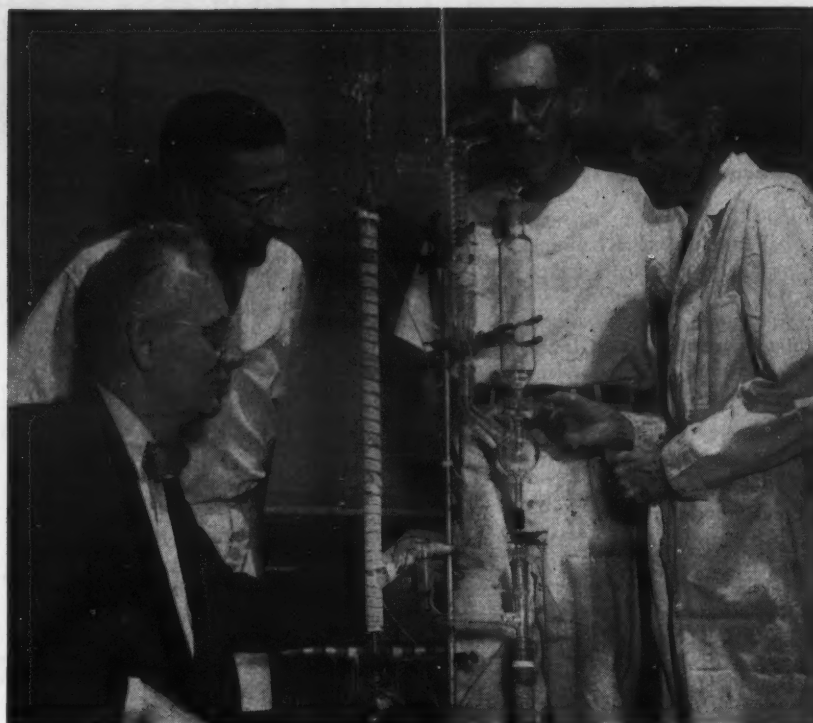
1. The sealing surfaces are the flattest, smoothest, most perfect ever molded on TEFLON Bellows.
2. The split standard steel flanges are doweled and bolted together, assuring perfect alignment and positive prevention of cocking at the split.
3. Limit bolts beyond O.D. of flange can be adjusted to restrain movement within longitudinal limits of bellows.
4. Bellows have integrally molded envelope type gaskets, eliminating use of rubber against steel.

The style E-8F Bellows are available in diameters 1" through 24".

John L. Doré Co.

SALES AGENTS IN U.S.A. FOR JOHN L. DORE, INC.
Du Pont's Teflon • Kellogg's Mel-F • Hi-Quality Nylon
P. O. BOX 7772 • HOUSTON 7, TEXAS

for the laboratory



Reasoning that in long heating or refluxing periods organic reaction products are degraded or caught up in side-reactions, four Kodak researchers — Dr. Charles F. H. Allen, John R. Byers, Dr. Wilbert J. Humphlett, and Dr. Delbert D. Reynolds — have devised systems for . . .

continuous organic reactions in standard lab equipment

Improved methods provide better quality products and, in many cases, higher yield

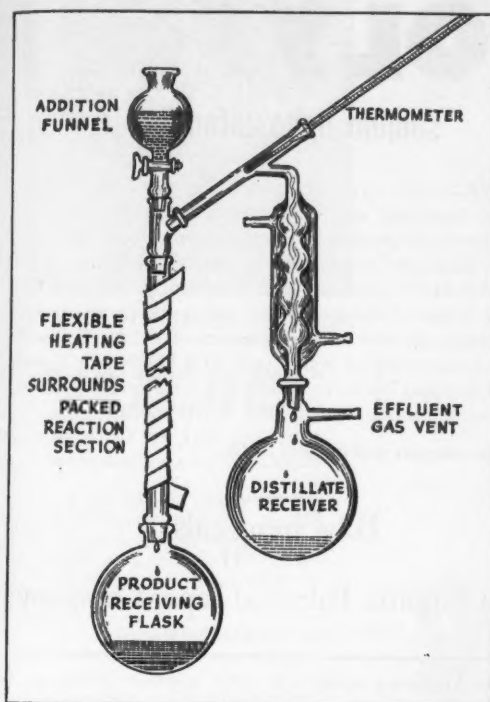
In the past the laboratory preparation of organic compounds has been done by batch process techniques. Four men of the Kodak Research Laboratories have investigated continuous laboratory preparation of organic chemicals. They find that continuous reactors can be built of standard glassware and materials for less than \$50. Simple and compact reactors designed along lines suggested here enable reactions to continue so long as starting ma-

terials are supplied and end product removed. Further, this apparatus keeps reacting chemicals in contact with hot surfaces for a shorter time than conventional reactors. As a result of this there are fewer side reactions, less degradation. In turn, this results in better quality compounds before purification and, in many cases, higher yield.

Work at Kodak has already proved the value of this continuous reactor scheme in reactions listed at right and in preparing materials of the types listed here.

Essential difference between continuous and batch laboratory reactors lies in the fact that a packed column is used as the site for continuous reaction.

When inquiring check CP 3050 opposite last page



Simple form of reactor

Continuous reactor has been used to prepare —

- carboxylic acid chlorides and amides
- phenoxy esters
- α , β -saturated esters, ketones, nitriles, nitro compounds
- alkyl bromides and nitriles
- pyrazolones
- isocyanates
- bromonitriles, bromo acids, bromo esters
- cinchoninic acids
- azlactones

In reactions involving —

- side-chain chlorination
- bromination
- Michael addition
- double decomposition
- Knoevenagel condensation
- esterification

Provisions must also be made for admitting reactants at the desired rate, controlling temperature of the packed column, and collecting products as formed. In the simple reactor shown, an addition funnel is used to add reactants. Often it is convenient to use a taller cylindrical funnel here so that heating tapes may be applied to it. From the funnel, reactants drop into packed section. Two packings commonly employed at Kodak have been glass helices and Berl saddles — depending on size of the packed column. At the foot of the column, a product receiving flask catches non-volatile materials formed.

Temperature of the column is controlled by heating

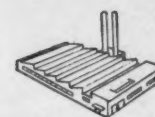
(Please turn to page 84)

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describes Harshaw's major activities.



When inquiring check CP 3051 opposite last page



Beach-Russ Type RP High Vacuum Pumps combine the best features of rotary and reciprocating pumps, providing greater speed of evacuation, consistent high vacuum, low power consumption and longer service life.

Whether it is titanium, magnesium, lithium, zirconium, germanium, calcium, silicon, vanadium, etc. . . if your process requires vacuum operation, your working vacuum can be reached faster and at lower cost with

BEACH-RUSS Rotary Vacuum Pumps

The Beach-Russ Type RP Pump is used extensively in processes involving vacuum or inert atmospheres for induction or arc melting, heat treating, alloying or refining. This versatile pump is available in capacities from 20 to 1800 c.f.m. for any laboratory, development or production work. It can be used on either a straight mechanical system, or in combination with a diffusion pumping system for higher vacuums.

The superior design, high efficiencies and slow operating speeds make the Beach-Russ Type RP Pump the best available mechanical pump for your work. Catalog 90 tells the full story.

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Address Department 46

When inquiring check CP 3052 opposite last page

LABORATORY

**For control of vacuum,
absolute pressure
to 1/10 mm . . .**

manostat models are calibrated
in 1/10 mm and 1 mm

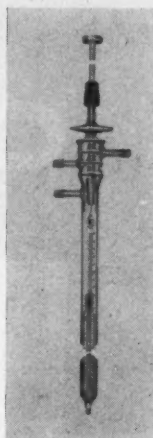
Uses: Absolute pressure (and vacuum) control for the laboratory.

Features: Two floats are available which produce readings from 0 to 10 mm in 1/10 mm divisions and 0 to 100 mm in 1 mm divisions.

Description:

Absolute and differential pressure control and indicator forms a compact unit. Direct setting of absolute or differential pressure can be made. Sensitivity is extremely high. Manostat measures as well as controls pressure. Once position is set, pressure is held.

(Cartesian Manostat #9 is a development of Emil Greiner Co., Dept. CP, 20-26 N. Moore St., New York 13, N. Y. Check CP 3053 opposite last page.)



Questions & answers — electron microscopes

Using question and answer technique, eight-page booklet explains in non-technical terms answers to questions frequently raised concerning operation and application of electron microscopes. Electron lens theory is explained together with such operations as shadow casting, specimen preparation, negative and positive replicas.

"Questions and Answers on Electron Microscopes" is issued by Research and Control Instruments Div., North American Philips Co., Inc., Dept. CP, 750 S. Fulton Ave., Mount Vernon, N. Y. When inquiring specify CP 3054 opposite last page.

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The POLYFON series of sodium liginosulfonates offers extreme versatility and effectiveness for dispersing wettable insecticide powders. In compounding DDT, Dieldrin, Aldrin, TDE, and many other toxicants with various carriers, POLYFON combines high dispersing power with the highest degree of storage stability and resistance to caking. It is commonly used in concentrations of 1% to 3% based on the total weight of ingredients. POLYFON is adapted to both 50% and 75% concentrates and is particularly suited to formulations designed to meet WHO specifications.

Send for samples and bulletin 301A.

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West Virginia Pulp and Paper Company

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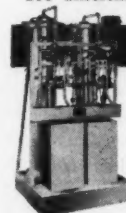
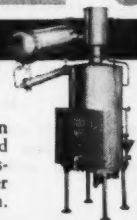
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Put a Barnstead Pure Water Still to work in your plant or laboratory. Since 1878 Barnstead equipment has been producing the purest distilled water — and at the lowest cost, too! Over 200 different sizes and models to choose from.



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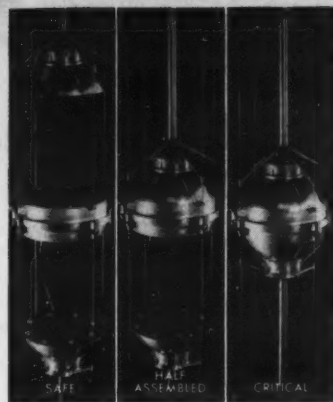
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When inquiring check CP 3056 opposite last page

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—where scientists and engineers, working with some of the Western World's finest equipment and facilities probe the unknown and seek answers to tomorrow's problems.

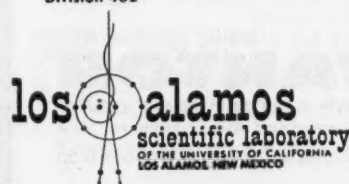
The Laboratory's program for pioneering in nuclear and thermonuclear power and nuclear propulsion, ranks in importance with the Laboratory's continuing and ever expanding achievements in atomic weapons research and development.

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For more detailed information, direct your inquiry and background resume to

DEPARTMENT
OF
SCIENTIFIC PERSONNEL
Division 402



FOR THE LABORATORY

Controlled temperature in gas-fired oven 100 to 1000°F

Standard model has work space 26 x 30 x 30 inches

Uses: Wide temperature range gives this unit ability to handle many jobs that conventional lab ovens could not. It was designed, for example, as a single unit for burning off old electric motor insulation and baking on new varnish after re-wiring.

Features: Adjustable temperature control will hold set temperature from 100 to 1000°F.

Description: All-steel in construction, with five inches of mineral wool insulation, standard



Drip pan of this oven is removable even while oven is in operation

oven furnishes work space 26 x 30 x 30 inches deep. Gas burners at bottom of oven supply heat. Heavy-duty grate is positioned over these burners. Partlow temperature controller is standard equipment.

Drip pan of the oven is removable from oven exterior — it may be taken out for cleaning even while oven is in operation.

Other sizes and specifications are built to order. Electrically heated units are also produced.

(Gas oven is manufactured by Grieve-Hendry Co., Inc., Dept. CP, 1401 W. Carroll Ave., Chicago 7, Ill. . . . or for more information check CP 3057 on form opposite last page.)



The new 8 speed BROOKFIELD VISCOMETER

*Measures
Viscosity
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With the new portable Brookfield eight-speed viscometer you can, at the flick of a switch, easily measure the viscosity of any fluid . . . readings down to 1/5 of 1 per cent with materials having viscosity of from 1 to 32 million centipoises.

If speed, accuracy, and versatility count with you, demand the new Brookfield eight-speed viscometer. A complete line of accessories makes the Brookfield adaptable to any viscosity measurement problem. Your prompt inquiry will bring complete information. Technical assistance available without obligation.

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When inquiring check CP 3058 opposite last page

**for Drying, Baking, Curing
Process Materials under
Controlled Conditions**

ROCKWELL OVENS

- Batch types—tray, rack or truck loading; standard and special.
- Conveyor types—belt, carrier, etc.
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When inquiring check CP 3059 opposite last page

ALLIED world's largest supplier of ELECTRON TUBES FOR INDUSTRY

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EVERYTHING IN ELECTRONICS FROM ONE DEPENDABLE SOURCE

When inquiring check CP 3060 opposite last page

LABORATORY

All about incubators — eight models

Anhydro and water-jacketed incubators are described in four-page bulletin. Data on eight models are included.

"Incubators" is issued by National Appliance Co., Dept. CP, 7634 S. W. Capitol Highway, Portland 19, Ore. When inquiring specify CP 3061 on form opposite last page.

Sweep up mercury from bench tops or floors . . .

"magnet" picks up spilled mercury — quickly, easily

Uses: Recovering spilled mercury from uneven, rough, dirty, or greasy surfaces.

Features: Amalgamated copper wire roller uses high surface tension of mercury.



Spilled mercury is swept up as in steps 1, 2, and 3 above

Description: Sweeper is of stainless steel except the spring and wire roller. Copper wire roller is amalgamated by dipping into nitric acid and then into clean mercury. Operation is necessary only once. Sweeper is op-

(Please turn to page 85)

Where can you use these high-purity chemicals?

Ammonium Paratungstate	Phosphotungstic Acid
Barium Carbonate	Potassium Silicate
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SYLVANIA

When inquiring check CP 3062 opposite last page

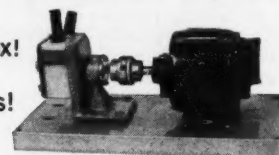
The Problem:

PUMPING HYDROCHLORIC ACID

The Solution:

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No stuffing box!
No gasket!
No shaft seals!



A large producer of industrial chemicals, seeking a portable carboy transfer unit for pumping concentrated HCL, solved his problem with a self priming Vanton "flex-i-liner" pump, Model XB-P30 (5 GPM). The polyethylene body block and Hypalon "flex-i-liner" are the only materials in contact with the fluid, and the design eliminates stuffing boxes and shaft seals. Pump and base are mounted on casters for portability. Maintenance has been reduced to annual replacement of the inexpensive "flex-i-liner".

For pumping corrosive fluids, abrasive slurries, and fluids which require no contamination, Vanton is a natural.

Catalog 55 on request.



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CHEMICAL PROCESSING

"1 for the gauge



"2 for the shelf"

*Saves you time . . .
avoids boiler breakdown*

Reduce maintenance time on boiler water-level gauges. For every gauge in your plant, order two spare gauge glasses.

Why? Here's why:

Spare No. 1 is handy for you when you need a gauge glass for regular replacement during routine maintenance.

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Application	Recommended Product
Normal conditions (Up to 100 p.s.i.)	CORNING brand standard gauge glasses
Higher temperatures	PYREX brand high- pressure gauge glasses
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Extra visibility	PYREX brand red-line gauge glasses
Viewing inside furnace, reactors, pressure vessels, etc.	PYREX brand sight glasses
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Visible discharge	PYREX brand oil-cup glasses

Your Industrial Distributor has the best
—gauge glasses by Corning. Call today!



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GLASS WORKS**
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Corning means research in Glass

When inquiring check CP 3064
opposite last page

FOR THE LABORATORY

**Separate gas fractions
and quickly analyze
complex mixtures . . .**

gas chromatography simplifies quantitative
analysis of gas mixtures

Uses: Separation of closely boiling isomers including liquid hydrocarbons; analysis for trace components; rapid quantitative gas analysis; and qualitative identification of organic compounds.

Features: Analyzer has two columns to allow use of two different adsorbents in analysis.

Description: Instrument is unit-package for gas chromatography. Simplified quantitative method of analysis is used, based on differences in adsorption affinity of components in a mixture. Measured gas samples are washed through a column filled with an adsorbent. Time required for each component to be washed is recorded and concentration in washing gas is measured. Instrumentation includes electronic strip chart potentiometer, thermal-conductivity cell, measuring burette mounted in constant-temperature air bath, one or two glass columns, switchboard with



controls and a flowmeter for attachment to a cylinder of carrier gas.

(Kromo-Tog is product of Burrell Corporation, Dept. CP, 2223 Fifth Ave., Pittsburgh 19, Pa. . . or for more information check CP 3065 on handy form opposite last page.)

**Specification, design
of flame photometer**

Four-page folder, printed in two colors, gives design data for flame photometer. It explains how instrument is constructed, and also describes automatic operation with sequential element determination. The information covers subjects of accuracy, sensitivity, atomizer, burner, electrical circuit, internal standard, optics, operating conditions, maintenance and accessories.

"Flame Photometer" is issued by Research & Control Instruments Div., North American Philips Co., Inc., Dept. CP, 750 S. Fulton Ave., Mount Vernon, N. Y. When inquiring specify CP 3066 on form which is located opposite last page.

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"SMALL BATCH"

SHEAR-FLOW



INDUSTRIAL MIXER

To meet the demand for a portable yet rugged mixer to be used by research and development technicians, Gabb engineers have produced this "Small Batch" industrial mixer.

Incorporating all the features of its companion models, this little giant can be used for homogenizing, mixing, dispersing and emulsifying.

Its counter-rotating impellers have a clearance of approximately .005" which produces a double shearing action for perfect dispersion of material. This mixer should be standard equipment in every plant requiring small batch mixing. Send the coupon for complete details and prices now!



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When inquiring check CP 3067 opposite last page

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FEATURE CONTROLLED CHEMICAL COMPOSITION

... so you get better and easier control during processing ... plus a better, more uniform end product.

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Elde's high purity gives you better processing ... greater uniformity in your finished products.

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METHYL ESTERS

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CAPROATE	PALMITATE	

*T.M. Reg.

For samples and specifications, write
Dept. P.



P. O. Box 599, Oakland 4, Calif.

When inquiring check CP 3068
opposite last page

FOR THE LABORATORY

CONTINUOUS ORGANIC REACTIONS

(Continued from page 79)

tapes fed through rheostats or variable autotransformers. Volatile products, as formed, will rise through column and can be caught by means of a condenser leading to the distillate receiving flask. Note that distillate receiver is vented. Typical setup described here is joined entirely with 29/42 and 24/40 standard-taper glass joints and can be clamped to a single ring stand.

Many modifications of this continuous reactor have been built. Schemes have been worked out in detail for a countercurrent of gas, and for irradiation of the reactants in the packed column. Larger sizes of the reactor have been built using Pyrex-brand pipe.

Work at Kodak has shown that this approach is most useful with reactions that proceed rapidly. Usually, some work must be done to find best time and temperature. Time and temperature are the principal controlling factors. Yields can usually be made virtually quantitative. Where yield is low, addition rate is usually too high or temperature is too low. If yield is low for all conditions, excess of one reactant or recirculation sometimes boosts yield. This is especially true in slow reactions such as esterifications and bromination of acids.

Even where yields are low, however, faster preparation of this material is an advantage.

Typical performance can be pointed up by preparation of ethyl benzalmalonate. This aldol-type condensation is commonly referred to as a Knoevenagel reaction. Best previous method had been azeotropic distillation to remove water formed. Continuous reactor produces this chemical in a ten percent lower yield than batch reactions — but while average time by the batch method is 16 to 48 hours, continuous method produces an 82 percent yield in 1½ hours and has produced the same yield in 30 minutes.

(This information was abstracted from a paper by Allen, Byers, Humphlett, and Reynolds of Kodak Research Laboratories.)

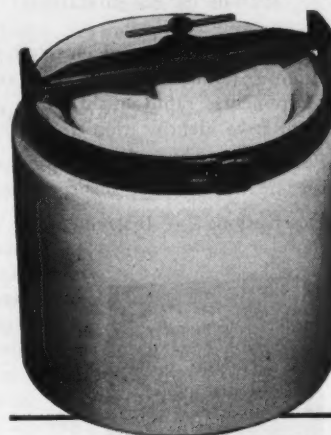
Introduces plastic labware made with Ziegler PE

Catalog of 12 pages pictures and describes polyethylene laboratory ware. Two items are included made from Ziegler Process polyethylene, beakers and centrifuge tubes. Laboratory ware described includes cylinders, funnels, beakers, tubing, stop-cocks.

Catalog D-1055 is issued by Palo Laboratory Supplies, Inc., Dept. CP, 81 Reade Street, New York 7, N. Y. When inquiring about this catalog reader may simply specify CP 3069 on Reader Service slip which is located opposite last page.

→ MCDANEL ←

BRINGS YOU A NEW CERAMIC LABORATORY MILL JAR!



• One-gallon size, designed with recessed, bronze hardware to prevent catching or holding on roller-type mills. Has smooth, long-wearing, high-grade ceramic body inside and out. Straight sides clean easily, quickly. Cover rests on soft rubber gasket, can be tightened by hand without cracking. No leakage. Order from your laboratory supply house now!



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REFRACTORY PORCELAIN COMPANY
BEAVER FALLS • PENNSYLVANIA

When inquiring check CP 3070 opposite last page



Write for Your
McDaniel Industrial
Ceramic Catalog NOW!

COLTON ROTARY PRESSES

CAPACITIES
65 TO OVER

5000

TABLETS
PER MINUTE

MIXERS—GRANULATORS—OVENS

FOR

HIGH PRODUCTION

AT

LOW COST

ARTHUR COLTON COMPANY

Established 1887

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When inquiring check CP 3071 opposite last page

CHEMICAL PROCESSING

**YOUR COMPLETE SOURCE FOR
THICKENING AGENTS
EMULSIFIERS • BINDERS
FLOTATION AGENTS • ADHESIVES**



Our years of experience in supplying these products to textile mills, paper mills, chemical processing industries, etc., can be useful to your particular problem.

Tell us your needs—our complete line is bound to contain the answer to your requirements.

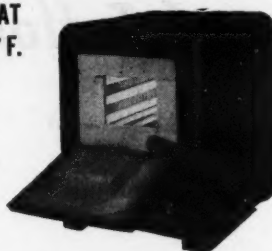
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Scientific Starch, Dextrine and Natural Gum Service
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When inquiring check CP 3072 opposite last page

TRENT MUFFLE FURNACES FOR THE "LAB"
UNIFORM, CONTROLLED HEAT
for temperatures UP TO 2300° F.

Only Trent Muffle Furnaces feature Trent "Folded-and-Formed" Heating Units—the unique heating unit design utilizing ribbon type resistor element Folded and Formed to give you maximum controlled heat radiation and uniformity... plus maximum physical rigidity for longer furnace unit life! Engineered for maximum operating temperatures of 2000° F. or 2300° F., Trent Muffle Furnaces assure faster, more efficient heating at reduced power consumption for chemical processing, enameling, ash determination, fusions and countless heat treating operations.

- Streamlined Design eliminates asbestos millboard and transite fronts
- Welded Construction features outer steel casing lined with laminated layers of high grade brick and slab insulation
- Heating Elements on all four sides of furnace chamber
- Hearth Plate of rugged ceramic, silicon carbide construction
- Fast Action Door—overlapping and plug type
- Build-in Controls: percentage input timer, pyrometer, on/off switch, pilot light, gold fuse



**TRENT MUFFLE FURNACES
NOW IN TWO NEW SIZES
TO MEET YOUR
OPERATING REQUIREMENTS**

Model HL-4—8 1/4" x 5 1/4" x 16 1/4"
deep; 4 KW, 230 volts, single phase, 60 cycle operation

Model HL-6—11 1/4" x 8 1/4" x 24"
deep; 10 KW, 230 volts, single phase, 60 cycle operation

Let an experienced Trent industrial heating engineer show you how you can improve your heating and processing operations with a Trent Muffle Furnace. And ask him to show you the new Trent "Folded-and-Formed" Heating Element booklet which describes the advantages of Trent installations for solving your industrial heating problems.



Electrically Heated Industrial Equipment
242 LEVERINGTON AVE., PHILA. 27, PA.
Branches in New York, Chicago, St. Louis, St. Paul, Minneapolis, and other cities.

When inquiring check CP 3073 opposite last page

LABORATORY

(Continued from page 82)

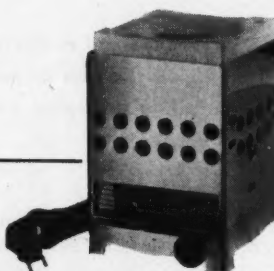
erated by rolling forward and backward over mercury particles. Single pool of mercury is then retracted by sweeper into catch pan. Catch pan is then lifted and emptied into container.

(Leco mercury sweeper is product of Laboratory Equipment Corporation, Dept. CP, St. Joseph, Michigan... or for more information check CP 3074 on form opposite last page.)

**Gives circuit data
on lab "pot"**

Four-page data sheet describes manufacturer's precision potentiometer. Circuitry and construction of the Type K-2 are given in detail. Accessories required for typical measurements are listed.

Data Sheet E-51(3) is issued by Leeds & Northrup Co., Dept. CP, 4934 Stenton Ave., Philadelphia 44, Pa. When inquiring specify CP 3075 on form opposite last page.



Controlled heat

Originally designed for nitrogen determinations, Type RH heater can now be used for such other tasks as distillations, evaporations, extractions and digestions, as well as many utility applications. Lateral rheostat provides instant response to change in setting. Rheostat wear is reduced by use of roller type contacts.

(Type RH heater is product of Precision Scientific Co., Dept. CP, 3737 W. Cortland St., Chicago 47, Ill... or for more details check CP 3076 on form opposite last page.)

DENVER PROCESS EQUIPMENT

DENVER	SIZES	SIZES	
(patented) SUPER AGITATORS and MIXERS		3' x 3' to 20' x 20'	Patented standpipe around propeller shaft assures positive agitation and circulation. Patented wearing plate prevents sand-up on shut-down. Heavy duty as well as acid-proof construction is available in both open-type, air lift and Super Agitator models. Please write for Bulletin No. A2-B4.
DENVER Steel-Head BALL MILL		3' x 2' to 6' x 12'	A Denver Steel-Head Ball Mill will suit your particular need. Five types of discharge trunnions. All-steel construction. Low initial cost due to quantity production. Quick delivery. Laboratory and pilot plant mills also available. Please write for Bulletin No. B2-B13.
DENVER CLASSIFIERS		18" to 60" Wide Suitable Length	Denver Rake Type Classifiers are available in sizes from 1'-6" x 14'-8" to 8' x 21'-8". Denver Spiral Classifiers range in size from 6" x 3'-8" to 60" x 33'-4". Denver Hydra Classifiers are available in diameters from 6" to 33". All are designed to efficiently separate fine particles in specific applications. Please write for bulletin No. C5C-B.
DENVER Forced-Feed JAW CRUSHER		2 1/4" x 3 1/2" to 32" x 40"	Cast Steel frame, manganese jaw and cheek plates. Large diameter shafts reduce shaft deflection and thus increase life of heavy-duty, oversize roller bearings in bumper. Setting easily controlled. Please write for Bulletin No. C12-B12.
DENVER Wet Reagent FEEDER		0 cc to 2000 cc	Accurately meters minute quantities of liquid from 0 cc to 2000 cc per minute. Float valve in tank permits connection of feeder to bulk storage device. Handwheel adjustment to control amount of liquid is simple and accurate. Used in multiples for higher capacities. Please write for Bulletin No. F6-B9.
DENVER Disc FILTER		1 Disc, 2' to 8 Disc, 6'	Special, patented design of segments in Denver Disc Filters use both gravity and vacuum to give a drier filter cake. Drainage is complete and positive, with no blow-back. Simple, low-cost, dependable construction. Quick delivery. Also Drum and Pan Filters. Please write for Bulletin No. F9-B2.
DENVER "Sub-A" FLOTATION		Laboratory and Commercial	Flotation is the selective separation of particles from each other in a liquid pulp by means of air bubbles. More large plants are installing Denver "Sub-A's" for their entire flotation job, because they give maximum recovery at a low cost per ton. Dependable, low-cost, simplified continuous operation. Please write for Bulletin No. F10-B01.
DENVER Wilfley Concentration TABLES		5 to 150 7/24 Hrs.	A mechanically operated, longitudinally reciprocating table consisting of a deck having a plane surface partly riffled and a tilting device. It separates materials into bands and handles the coarsest sands with excellent results. Ideal for separation of groups of particles having a similar range of specific gravities. Write for Bulletin No. T1-B3.
DENVER LABORATORY EQUIPMENT		Batch or Continuous	Batch and continuous test models of Crushers, Screens, Ball Mills, Pulverizers, Rod Mills, Classifiers, Agitators and Mixers, Pulp Distributors, Feeders, Flotation Machines, Pumps, Thickeners, Filters, Dryers, Tables, Samplers. Results obtained on Denver Laboratory Equipment can be duplicated by commercial machines. Please write for Bulletin No. LQ3-B10.
DENVER Standard DRYERS		2' x 13' to 5' x 40' and larger	Available in several types: Direct Heat, Indirect Heat, and Steam Tube. Let DECO Engineers solve your drying problem. No dryer problem too small or too large. Please write for Bulletin No. D4-B2.

"The firm that makes its friends happier, healthier and wealthier"

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When inquiring check CP 3077 opposite last page

***lolyte* LAMINATED FIBERGLASS FOR CORROSION RESISTANCE**



***lolyte* TANKS** Fabricated to your Specifications

NO MOLDS NEEDED—Made any size, any shape, at no extra cost and no loss of delivery time.

UNIFORM DIMENSIONS — NO TAPERING—Dimensions are same at bottom and top . . . means larger capacities than tapered molded tanks.

FLANGES, DAMS, Etc.—Can be inexpensively equipped with flanged connection, holes, overflow dams, baffles, separations, etc.

CHEMICALLY RESISTANT THROUGHOUT—Fabricated from *lolyte* sheet properly reinforced. This is a structural material . . . not a lining.

Write for literature, prices, and table of chemical resistance for lolyte tanks, corks, ducts.

***lolyte* CROCKS**

Available
from Stock



PRICE LIST

Gal. Cap.	Outs. Diam.	Outs. Hght.	List Cost	Gal. Cap.	Outs. Diam.	Outs. Hght.	List Cost
5	9"	18"	18.00	14	18"	12"	35.00
5	10"	15"	18.00	20	18"	18"	40.00
5	12"	16"	22.00	26	18"	24"	45.00
8	12"	20"	24.00	30	18"	28"	49.00
10	12"	24"	26.00	40	18"	36"	59.00
12	12"	24"	23.00	50	18"	48"	69.00
9	10"	24"	21.00	27	22"	18"	49.00
7	9"	24"	26.00	30	22"	20"	53.00
10	16"	12"	28.00	35	22"	36"	70.00
12	16"	14"	33.00	55	22"	48"	83.00
15	16"	18"	40.00	73	22"	22"	76.00
20	16"	24"	49.00	95	28"	36"	98.00
30	16"	36"	59.00	125	28"	48"	125.00
40	16"	48"					



***lolyte* DUCTS**

ANY DIMENSIONS ANY CURVES ANY LENGTHS

lolyte has greater resistance to chemical attack than stainless, Monel, or aluminum. 1/5 the weight of steel, it is superior in tension, flexural, and compression strength. Unlike thermoplastics *lolyte* will not heat-distort below 350 deg.

Send drawings or prints for quotes and ask for literature giving chemical resistances.

Order from us or your distributor. Unless rated firm, payment with order. No COD's.

ALL PRICES F.O.B. FACTORY

SCHORI PROCESS DIVISION

FERRO CO CORPORATION

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FACTORY: 59-31 54th STREET, MASPETH, L. I.

corrosion control



When heated to 720°F, reinforced Teflon (right) retained its flatness, while pure Teflon distorted badly

**Incorporation of inert fibers
by process which maintains
fiber structure —**

extends range of Teflon

**Reinforced material resists cold flow and heat
distortion at temperatures up to 600°F
while retaining most of its chemical inertness**

Reinforcement of Teflon with inert, inorganic fibers by a method in which the structure of the fibers is maintained has resulted in a product with increased operating range. The recently developed material resists cold flow, heat distortion, and extrusion at temperatures up to 600°F while retaining most of the chemical inertness of Teflon. Tests by major manufacturers indicate that material may be used in continuous service up to 500°F and intermittently up to 600°F. Electrical and dry lubricating properties of Teflon are somewhat reduced.

Reinforced Teflon has been successfully tested as a gasket material for chemical processing equipment and for such fabricated parts as valve seats and guide bushings. Although pure Teflon has been extensively used in these applications because of its unusual corrosion resistance, under conditions of high pressure and temperature, the material has been

found to cold flow and extrude. Reinforced material withstands these higher temperatures and pressures.

For example, when scarf-cut gaskets of reinforced Teflon were used for backup rings in aircraft hydraulic systems, a run of 50,000 cycles at 500°F in diester hydraulic fluid was obtained without appreciable deterioration. Pure Teflon gaskets cold-flowed and lost their ability to retain O-rings in place under the same conditions.

In one test, sheets of each material were subjected to a temperature of 720°F. After cooling, pure Teflon was badly distorted while reinforced material retained its flatness.

In another test, the two materials were tested at 700°F under a torque of 35 lb and a flange pressure of 1000 psi. After two hours the flanges were cooled and the bolts retightened. Flanges were then exposed

When inquiring check CP 3078 opposite last page



When subjected to a torque to 35' lb and a flange pressure of 1000 psi at 700°F, reinforced material (right) did not extrude while pure Teflon extruded badly on all edges

to heat for another two hours. Pure Teflon gasket extruded extensively on all edges and lost all bolt torque.

Reinforced material did not extrude and retained 15 lb bolt torque, demonstrating significantly higher resistance to cold flow.

Work is currently under way to improve the electrical properties of the reinforced material since they are somewhat below that of pure Teflon.

(Duroid 5600 reinforced Teflon is product of the Rogers Corporation, Dept. CP, Rogers, Conn. . . . or check CP 3079 on form opposite last page.)

**Positive leak-tight joint
given by stainless clamp
with gasket and ferrule**

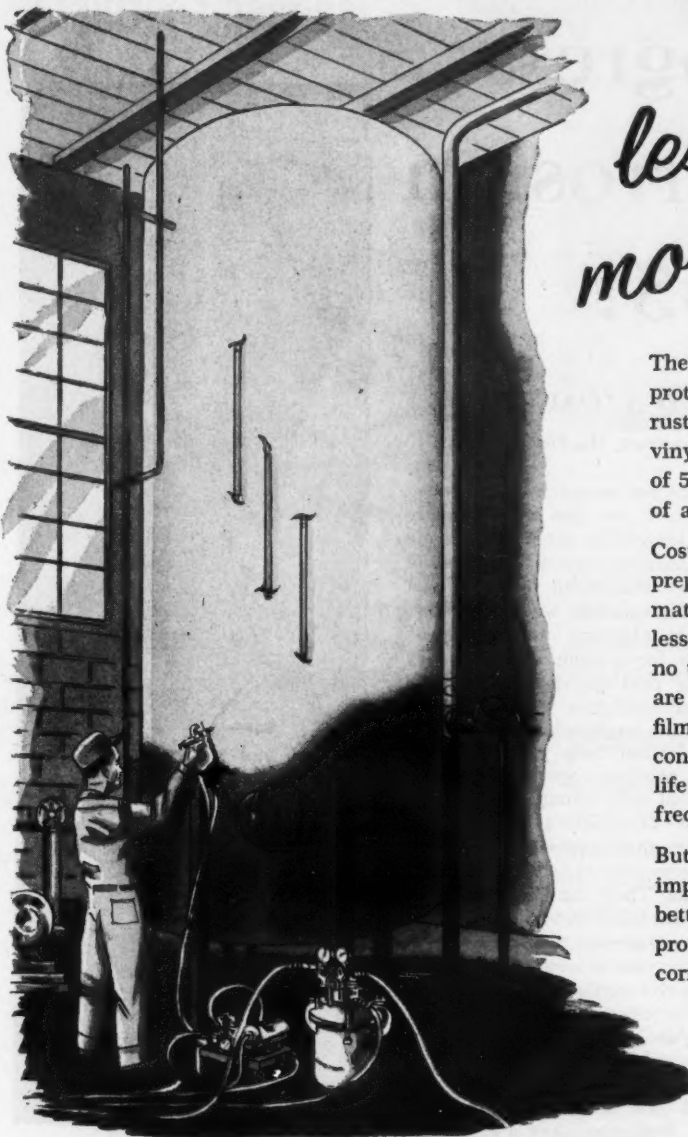
Uses: For joining stainless tubing or pipe.

Features: Clamp is constructed so that it provides a positive leak-tight joint.

Description: Stainless steel clamp fitting consists of a flange-type ferrule, a precision-molded gasket which fits into the grooved ferrule lip, and the clamp itself. Spring clamp grips ferrule edges, and bolt-type coupler assembly secured to the clamp ring. Unit provides speed and ease of installation on lines conveying corrosion-resistant liquid.

(Tri-Clamp fitting is a product of Ladish Co., Tri-Clover Division, Dept. CP, Kenosha, Wisconsin . . . or for more information check CP 3080 on handy form opposite last page.)

HERE ARE COMPANION PRODUCTS TO MAKE YOUR FIGHT AGAINST CORROSION...



*less costly-
more effective*

They are: Tygorust — a primer that locks protective coatings to damp or dry rusted steel; and Tygon "ATD"* Hot Spray vinyl which builds up a film thickness of 5 mils or better in just two passes of a spray gun.

Cost savings are big. First of all, surface preparation costs are reduced materially. Second, material costs are lessened because Tygon Hot Spray requires no thinners. Third, application costs are lowered because two spray passes give a film thickness equal to five coats of conventionally applied paints. Fourth, longer life means lower maintenance costs, less frequent recoating.

But cost savings are, in a sense, the least important part of the story. You get better protection, more complete protection, longer lasting protection from corrosive attack.

***ADHESION
THICKNESS
DENSITY**

Get the full story today. Write for your free copy of the TYGON painting manual. Address: Plastics & Synthetics Div. U. S. Stoneware, Akron 9, Ohio.

**PLASTICS AND
SYNTHETICS
DIVISION**

U. S. STONEWARE

AKRON 9, OHIO

New York • Chicago • Houston

When inquiring check CP 3081 opposite last page

Corrosioneering News

Quick facts about the services and equipment Pfaudler offers to help you reduce corrosion and processing cost.



Published by The Pfaudler Co., Rochester, N.Y.

What Progress Against Corrosion in 1955?

A top-level report by DONALD A. GAUDION

Vice-President, The Pfaudler Co.

How big a problem is corrosion?

Some sources tell me it costs industry about six billion dollars a year. In petroleum alone, every barrel of crude oil processed eats up 9¢ worth of equipment.

And with today's trends toward higher pressures, higher temperatures, continuous processes, you can expect corrosion to step up its attack on your equipment.

At Pfaudler, we traffic in corrosion-resistant equipment. Our specialty is a material called "glassed steel"—acid-alkali-resistant glass, permanently fused to steel, to give you the corrosion resistance of glass plus the structural strength of steel.

At the same time we have developed a broad knowledge of corrosion-resistant alloys, like Hastelloy, inconel, monel; the stainless steels; aluminum; copper; titanium; and synthetics, such as Teflon and Kel-F.

Guarantee against corrosion

Several innovations appeared, to help you lick corrosion. A hitherto unheard of guarantee was given: No corrosive destruction for 12 months on Pfaudler glassed steel equipment!

We also introduced a new glassed steel dryer-blender . . . Bigger reactors in money-saving standard designs . . . New nonmetallic seals for agitators on reaction kettles . . . New glass Turbogrid column trays . . . and other new or improved units.

While our research crew probed the future, we also added greatly to our knowledge of corrosioneering by examining reports from users of Pfaudler equipment over the past year. For example, we learned that, in 28 installations, our "packaged" system for plating acid recovery usually paid for itself in 6 to 12 months.

More engineering services

To further help you with corrosion problems, we revamped our technical staff, adding a new Applications Engineering Group. You can add their experience to yours whenever you are faced with special projects. They can "take over" if you want them to.

Corrosion Seminars

To increase general knowledge of new developments, we conducted four Corrosion Seminars during the year. Also, technical talks and articles were delivered by Pfaudler people. In research, we have continued our scholarships at Ohio State, Rochester, and Penn State Universities, Rochester Institute of Technology and Rensselaer Polytechnic Institute.

To you, who must pay the bill for corrosion, we believe these progressive steps are significant and worthy of your investigation. Meantime, we are searching daily for new approaches, and will report frequently to you on the pages of this publication.



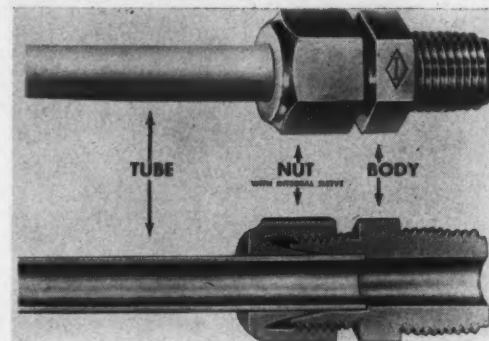
A comprehensive report on the new equipment mentioned by Mr. Gaudion is available, and will be sent to you on request.

CORROSION CONTROL

Corrosion-resistant tube fittings made of Du Pont Zytel . . .

withstand temperatures from -70 to 250°F and pressures of 500 psi

Excellent corrosion resistance is provided by tube fittings made of Du Pont's Zytel, a form of nylon. Fittings withstand temperatures from -70 to 250°F , as well as repeated steam sterilizations. They resist working pressures of 500 psi at a



Fittings can be used with plastic or metal tubing

temperature of 120°F . Material is impervious to most acids and alkalis. Fittings can be used with stainless steel, nylon, polyethylene, aluminum, copper, and other tubing.

(Nylo-Seal tube fittings are product of The Imperial Brass Mfg. Co., Dept. CP, 1200 W. Harrison St., Chicago 7, Ill. . . . or for more information check CP 3083 opposite last page.)

Covers polyethylene-coated aluminum jacketing

One interesting item in four-page bulletin is corrugated aluminum jacketing covered with a film of polyethylene for protection to insulation. This material has been found to be of considerable advantage in providing protection from fumes in hydrochloric acid plants. Polyethylene is permanently bonded to the aluminum and is free of pinholes, thereby completely protecting the aluminum.

Bulletin also describes aluminum jacketing which has a polyethylene-coated natural kraft paper resin bonded to the aluminum surface. This paper retains its barrier characteristics up to 350°F . Jacketing is not only vapor proof, but is water, fire, and vermin proof as well.

Bul on Al-cor-jac aluminum jacketing is issued by Aljon Manufacturing Co., Inc., Dept. CP, Chestnut St. and Highland Pkwy., Roselle, N.J. Specify CP 3084 opposite last page.

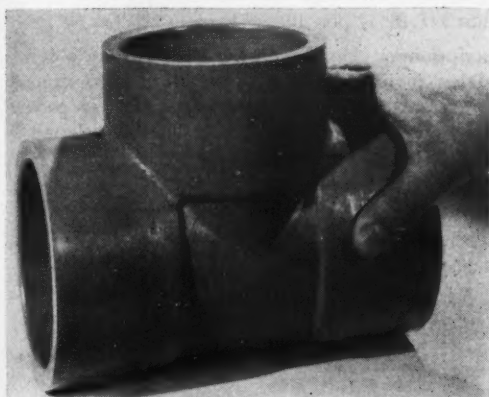
When inquiring check CP 3082 opposite last page

**Large size PVC fittings
are manufactured by
injection molding . . .**

make economical erection of 3 or 4" PVC piping system possible

Uses: For erection of larger size PVC piping systems in the chemical, petroleum, and other fields.

Features: Fittings are made of unplasticized polyvinyl chloride (PVC) and are injection molded in 3 and 4" thread and socket types, in addition to the sizes from 1/2" up that have previously been



PVC fittings are injection molded up to 4" in size

available from manufacturer. Pipes provide exceptional resistance to corrosive attack, and are easy to erect and disassemble. Initial cost of this piping is also less than piping of other materials usually employed where acute corrosion problems are present.

Description: Fittings are made by Hendry injection molding process, which gives them inherently more desirable physical characteristics. Included are 90° and 45° elbows, tees, couplings, and flanges. The socket-type are designed for attachment to pipe by solvent or fillet welding.

(PVC fittings are made by Tube Turns Plastics, Inc., Dept. CP, 224 East Broadway, Louisville 1, Ky. Check CP 3085 opposite last page.)

**Chemical resistance of valve metals
and seat materials**

Of considerable interest to corrosion engineers should be the four-page table presented in bulletin on butterfly valves which gives the resistance of six valve metals and six resilient seat materials to more than 150 chemicals.

Bul C-3 is issued by Keystone Tool Corp., Dept. CP, 5325 Kirby Dr., Houston 5, Tex. When inquiring specify CP 3086 opposite last page.

How Stauffer Chemical whips fan corrosion

Silver metallizing
stretches wheel life from 6 weeks
to better than one year
in corrosive gases.



Fan rotor being metallized with silver
for protection against corrosive gas

The *Stauffer Chemical Company*, Niagara Falls, N. Y., operates a chloro-organic acid unit in which process fans are used to convey corrosive gas in the operation of a column. Gas is primarily anhydrous hydrogen chloride, contaminated with small quantities of chloro-organic acid compounds.

A number of different coatings were tried out in an effort to prolong the life of the stainless steel wheels and shafts, as well as the cast-iron housings. Best of these lasted 4 to 6 weeks on the wheels, 2 to 4 months on the housings.

Test work carried on with *Metal-Cladding, Inc.*, of North

Tonawanda, N. Y., indicated that fine silver was relatively unaffected by the gases in use. So the first wheel was metallized with this material after the base metal had been mechanically cleaned, sprayed with .005" of molybdenum for a bonding base, and .020" of nickel for toughness. Final silver coating was .025" thick.

A year later the first metallized surfaces were still in excellent condition. Since the cost of the metal spray work was about equal to the cost of a new untreated unit, the application paid for itself in about three months. In addition, inspection time and downtime were substantially reduced.

The following *Metco* System* contractors are set up to help you solve your corrosion problems with metallizing. For further information or copy of descriptive bulletin, write, wire or phone *Metco Systems* headquarters, address and phone number below.

*Reg. U.S. Pat. Off.

**Metco
System
Contractors**

Akron Sand Blast Co.
Arthur Tickle
Engineering
Works, Inc.

Dix Engineering Co., Inc.
F. W. Gartner Company
Gulf Engineering
Company, Inc.
Metal-Cladding Inc.

M W Protective Coatings
Div. of Metalweld, Inc.
St. Louis Metallizing Co.
The Southern
Galvanizing Company

Metco Systems

10 Bridge Street, Westbury, Long Island, New York
Telephone: Edgewood 4-1308

METCO SYSTEMS
10 Bridge Street,
Westbury, Long Island, N. Y.

Please send me descriptive bulletin on the *Metco Systems*.

name _____

title _____

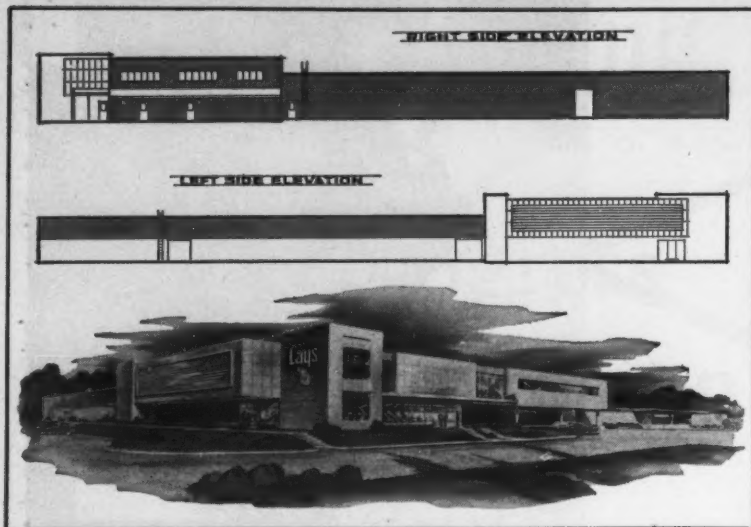
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address _____

city _____ zone _____

state _____

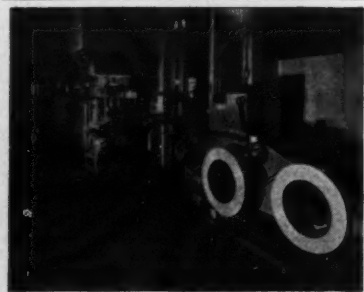
When inquiring check CP 3087 opposite last page



Aluminum, Alodized with Architectural Alodine,[®] needs no painting, retains its finish for life.

Alodizing with Architectural Alodine — a revolutionary new chemical process which converts aluminum surfaces to an amorphous phosphate — adds years to the already long life of aluminum. It produces colors ranging from a gray-green to a deep green resem-

bling the patina of aged copper, requires no painting, retains its new look for life. In addition, it cuts reflectivity 30% or more, and is much less expensive to use than the more complex anodizing process. Ask for Bulletin 1366 — it gives complete information.



Aluminum Awning Manufacturer finds Alodizing with Alodine 2 times as fast, 4 times as efficient

Previous process needed more time, and finish was too brittle for roll forming. Alodizing with Alodine has had a twofold production benefit: it has cut operating costs about two-thirds and has increased output 50%. And the Alodine amorphous phosphate coating forms such a durable and tenacious bond that roll forming of the slats after the enamel has dried does not damage the finish. We can offer the same product advantages to you. Ask for Bulletin 1241A.

Granodine[®] Coating Inhibits Rust Anchors Finish on Food Freezers

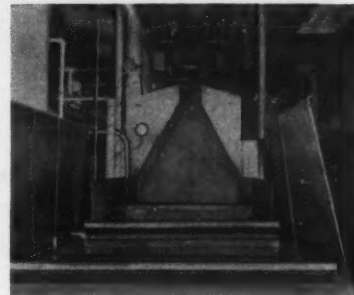
This phosphate coating not only provides a constant barrier against rust, but it affords a positive means of anchoring the paint finish to the metal. Granodizing with Granodine offers



another advantage, too — it prevents the spread of rust when the finish is accidentally chipped or scratched. Ask for Bulletin 915A.

Thermoil-Granodine Cuts Friction 60% Combats Scuffing and Cylinder Scoring, Speeds Seating of Piston Ring Sets

This inexpensive and practical method of preventing metal-to-metal contact reduces friction up to 60% by giving the rings an iron manganese phosphate surface. Also it lengthens life and speeds the normal seating time of the rings. It is corrosion resistant and rust-proof, too. These advantages are largely due to the lubricant-adsorbing characteristics of the Thermoil-Granodine surface. But they are also explained by the etching effect of the solution which produces a porous sur-



face under the coating and leaves minute oil reservoirs in the metal when all traces of the coating have disappeared. Ask for Bulletin 915A.

Granodraw[®] Coating Facilitates Cold Forming and Extrusion, Improves Drawing, and Lengthens Die Life

Granodraw is a zinc phosphate coating used with suitable lubricant to facilitate the cold mechanical deformation of carbon steels. Typical applications include tube drawing operations, cold forming of blanks, shells, and heavy stampings. Another ACP product, Granodraw SS, is designed for the treatment of stainless steels. Ask for Bulletin 915A.

Rodine[®] Cuts Pickling Costs

These pickling-acid inhibitors retard the attack of the acid on the metal without affecting its ability to remove scale. In straight-line pickling of wire, rod and tube, Rodine makes available more metal for drawing. In batch pickling, it improves the surface. In continuous strip pickling, it prevents overpickling during line shutdowns. Wherever used, Rodine saves acid and metal. Ask for Bulletin 270B.



AMERICAN CHEMICAL PAINT COMPANY

Ambler 29, Pa.

Detroit, Mich. • Niles, Calif. • Windsor, Ont.

CORROSION CONTROL

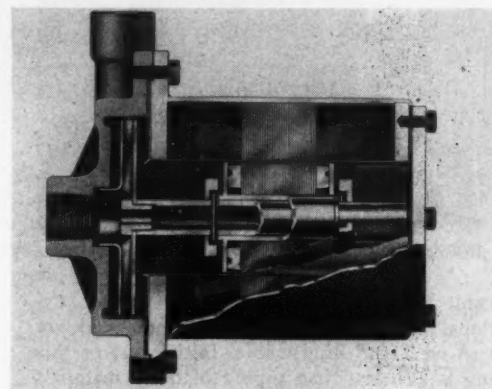
Corrosion-resistant service over wider scale possible with canned pump . . .

unit now available at lower cost with greater variety of materials of construction

Uses: Leak-proof, corrosion-resistant service at capacities to 170 gpm and heads to 150 feet.

Features: Canned pump design utilizes fabricated parts which can be clad with such metals as titanium, zirconium, and Hastelloy series metals in addition to standard Monel, Carpenter 20, and various stainless steels. Wider-scale, corrosion-resistant service is possible.

Description: Units are priced lower than older models. Cooling for stator windings, rotor and bearings, as well as bearing lubrication is provided by a patented cooling and fluid circulation



Bearings can be replaced from front or rear of pump without special tools

system. No external cooling circulation tube is used. Bearings are semi-floating and can be replaced from front or rear of pump without special tools and without breaking piping connections.

(Canned rotor pumps are a product of Chempump Corp., Dept. CP, 1300 East Mermaid Lane, Philadelphia, Pa. . . or for more information check CP 3089 on handy form opposite last page.)

Applications of surface alloying technique described

Method of diffusing chromium into the surface of ferrous metals at high temperatures is described in four-page bulletin. Procedure increases the heat, wear and corrosion resistance of the metal. Bulletin presents 19 typical applications for the process.

Bul on Chromizing is issued by Chromalloy Corp., Dept. CP, 109 W. 64th St., New York 23, N.Y. When inquiring specify CP 3090 on form opposite last page.

You, too, can cut costs, increase production, add years to your product's life with these ACP Chemicals and Processes

And still another advantage to users of these ACP chemicals and processes is offered by ACP. Its Engineering Department will help in the development of the process and process equipment.

Its Service Department will make periodic inspection of the process in operation and the equipment. Its Quality Control Laboratories will run tests of finished coupons. All are free of charge.

When inquiring check CP 3088 opposite last page

LOOK TO ATLAS FOR CORROSION PROTECTION

CORROSION - PROOF CEMENTS

Atlas manufactures a complete line of corrosion proof cements, each designed to do a particular job. The choice involves a thorough study of conditions and materials being handled.

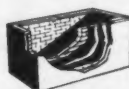


PROTECTIVE COATINGS

A protective coating to solve your specific problem. The recommendation of a coating most suitable for customer conditions is a regular Atlas service.

CORROSION PROOF LININGS

There is an Atlas tank lining to solve your corrosion problem. Atlas linings are based on the highest quality manufactured materials available. Installed at an Atlas plant or in the field.



Write for Bulletin CC#3 for complete information on the Atlas line.

When inquiring check CP 3091 opposite last page

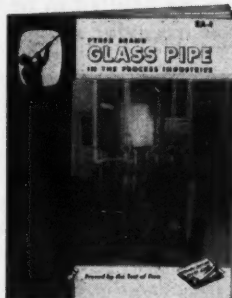
How many of these pipeline headaches do YOU have?

- ☐ Corrosion ☐ Clogging
☐ Cleaning ☐ Cost
☐ Contamination

This Corning bulletin can help you

"PYREX brand 'Double-Tough' glass pipe in the Process Industries" tells how others in a variety of process industries are whipping tough piping problems with glass pipe. You'll recognize the names of most of the companies who are using PYREX pipe to handle such acids as sulphuric, hydrochloric, nitric, acetic, and such other fluids as chlorinated hydrocarbons, hydrogen peroxide, bromine, brines, low-concentration alkaline solutions, wine, milk, other beverages and foods.

The book covers a wide range of products, problems and processes. Among them you may well find problems similar to yours—solved with PYREX pipe. Bulletin EA-1 is free. Simply send the coupon or check this publication's reader service card for your copy.



Coating means research in Glass

CORNING GLASS WORKS

31 CRYSTAL STREET, CORNING, N. Y.

Please send me Bulletin EA-1: "PYREX brand 'Double-Tough' glass pipe in the Process Industries."

Name Title
Company
Address
City Zone State

When inquiring check CP 3092 opposite last page

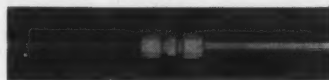
CORROSION

Stop galvanic corrosion
resulting from joint
of two metals . . .

insulators are fabricated
from polyamide resin

Uses: For applications at junction boxes, panel boards, bulkheads, and other uses.

Features: Insulator eliminates galvanic action which results from joining dissimilar metals. With its use, brass, aluminum, copper, and steel may be joined.



For joining dissimilar metals

Description: Insulators are made of Zytel, a polyamide resin. Units are made in a complete line of shapes and in 1/16 to 1" tube and pipe sizes.

(Swagelok galvanic insulators of Zytel are product of Crawford Fitting Co., Dept. CP, 884 East 140th St., Cleveland 10, Ohio . . . or for more information check CP 3093 on form opposite last page.)

Oil country pipe of plastic

Showing how and where company's pressure-rated oil country pipe is used to combat corrosion is subject of four-page folder. Full data is given on uses and applications of rigid PVC pipe for transmission lines, gas lines, gathering and lead lines, and chemical lines.

Included is a properties chart, showing special characteristics of this pipe together with ratings on its high impact and tensile strength, and aging qualities.

Bulletin on oil country pipe is issued by Alpha Plastics, Incorporated, Dept. CP, 14 Northfield Road, West Orange, New Jersey. When inquiring specify CP 3094 on form which is located opposite last page.

for IMPROVED PARTICLE SIZE REDUCTION...



NEW IMPACT-RESISTANT ROTOR and LINER!

abrasion-proof • corrosion resistant • chemically inert

The "Entoleter" Impact Mill now features a rotor and liner with highest abrasion-resistant ceramic material at points of impact . . . commercial applications prove outstanding wear and corrosion resistant characteristics required for particle size reduction in the CHEMICAL INDUSTRY.

For further information concerning lower maintenance costs on particle size reduction or ingredient dispersion . . . fill in the coupon below:

Name Title
Company Street
City Zone State
TYPE OF MATERIAL PROCESSED.....

☐ I am sending a sample of our product (5-25 lbs.) to your laboratory for free processing on the new "ENTOLETER" IMPACT MILL with the new rotor and liner.

The trademark
"ENTOLETER" is
your guarantee
of complete
satisfaction

ENTOLETER DIVISION

The Safety Car Heating & Lighting Company, Inc.
1169 Dixwell Ave. New Haven 4, Connecticut

When inquiring check CP 3095 opposite last page

what
**ALL-
STAINLESS**
design means
to
horizontal
plate
filters...



Crucible stainless steel, type 304, is used throughout this Sparkler standard horizontal plate filter.

Constant filtration of chemicals, pharmaceuticals, foods and liquids subject this horizontal plate filter to pretty rugged corrosive, abrasive and temperature conditions. That's why Sparkler Manufacturing Co. uses all-stainless steel construction.

For stainless, first of all, fights off corrosive attack. And it's strong. Stainless becomes tougher the more it's used... which is another way of saying that, with stainless, abrasion is no prob-

lem. And neither is cleaning. For stainless steels' smooth, bright surface comes clean with a minimum of effort... stays clean longer.

The fact is, stainless makes any equipment stronger, longer-lasting, easier to use. Check with your local Crucible representative for help in selecting the best stainless grade for your job. Or write *Crucible Steel Company of America, The Oliver Bldg., Mellon Sq., Pittsburgh 22, Pa.*

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

When inquiring check CP 3096 opposite last page

CORROSION CONTROL

**Modified epoxy coating system
resists 73% caustic at 275°F
and 37% HCl...**

straight phenolic air-dry coating also available

Uses: For providing protection to tank cars and process equipment.

Features: One of outstanding coatings offered by manufacturer consists of a system comprised of a combination of four different modifications of the epoxys which will withstand 73% caustic at loading temperatures of 275°F. It will also withstand 37% HCl.

A straight phenolic coating which is an air-dry material with chemical and acid resistance comparable to high-baked phenolics can also be furnished. This material is available in any color and is completely non-toxic.

Description: Coatings available cover complete range of the epoxys, both air-dry and high-baked; also the phenolic resin field along with vinyls and vinyl mastic finishes.

(Leader-Kote protective coatings are product of Coatings Div., Leader Iron Works Inc., Dept. CP, 410 N. Michigan Ave., Rm 460, Chicago 11, Ill. Check CP 3097 opposite last page.)

**Permits plastic coatings
to be applied to small
or irregular shapes...**

fluidized process provides uniform coatings
up to 3/16" thickness

Uses: For providing corrosion-resistant coatings of polyethylenes, polyfluorocarbons, nylon, and other plastics on metallic and dissimilar plastic molded targets.

Features: Coating method permits small or irregular shaped objects to be coated.

Description: Process involves use of a powder fluidizer, a compact unit consisting of specially-designed gas distribution system which maintains the plastic powder in a turbulent dense fluid state. Appearance of fluidized bed closely resembles that of a boiling liquid. Line of specially blended polyethylene coating powders is also available.

Fluidized-coating process provides a uniform coating up to 3/16" thick. Target to be coated is first preheated to predetermined temperature, then immersed in fluidized coating powder for from 10 to 15 seconds. It is then replaced in the oven and allowed to cure for a short period.

(Fluidized-coating process is development of American Agile Corp., Dept. CP, 5461 Dunham Rd., Maple Heights, O. Check CP 3098 opposite last page.)

NOT ONE...NOT TWO...BUT
THREE TIMES



Cat-a-lac Primer
has three times the
**CORROSION
INHIBITING**
qualities of any known
specification primer

ALSO proven to be a 100% more efficient
barrier to Galvanic Erosion
due to dissimilar metals

...In any system of protective coatings the PRIMER is the factor that makes it effective. That is why we suggest that you consider this three-times-more-effective primer wherever corrosion or galvanic action is a problem. Any type of top coat can be applied over Cat-a-lac Primer. In many cases where appearance or color is not a factor Cat-a-lac Primer alone will provide adequate effective protection against corrosion and galvanic erosion on all metals including MAGNESIUM.

You are invited to write for your copy of "Finch Facts", technical data on Cat-a-lac Primer and Cat-a-lac Top Coat.



FINCH PAINT & CHEMICAL CO.
Division of Desmond Brothers Paint Company
Torrance, California

When inquiring check CP 3099 opposite last page
JANUARY, 1956

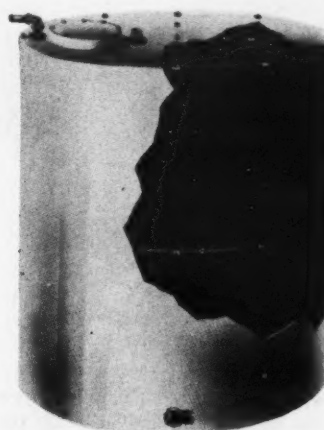
CORROSION

**Flexible tank liners
resist phosphoric,
nitrogen solutions...**

can be inserted in tank
through 2' manhole

Uses: To protect the wall of tank from corrosive effect of contents and at the same time to protect the contents from iron contamination by the tank.

Features: Over test periods ranging from one to four years, flexible plastic material has shown no adverse effects when exposed to 75% phosphoric acid and 40%



Flexible liner can be easily installed in storage tanks

nitrogen solutions. This has been in the presence of sunlight and temperatures up to 150°F. Product can be used for intermittent temperatures up to 200°F.

Liner is rolled in such a manner when received that it can be inserted in tank through a 2' manhole for tank sizes up to 30,000 gallons.

Description: Flexible liners are liquid-tight cylindrical sacks made of plastic sheeting. Different materials are available according to corrosives handled. The large bags can be easily installed inside storage tanks. All-plastic inlet and outlet assemblies are provided in conjunction with liner units.

(Flexi-Liner is a product of Flexi-Liner Company, Dept. CP, P.O. Box 766, Arcadia, Calif. Check CP 3100 opposite last page.)

*Here's How to Handle Corrosives
at High Peripheral Speeds*



**CHEMLON YARN
PACKING STYLE C-30
Made of TEFLON* FIBER
BY "JOHN CRANE"**

Chemlon Yarn Style C-30 extra tough packing gives you two important advantages not provided by other types of braided or molded Teflon packing: 1) positive sealing efficiency at high peripheral speeds; 2) cooler running stuffing box under severe service conditions.

Style C-30 can be used to handle the most destructive acids, alkalis or solvents. The excellent thermal properties of Teflon, combined with the softness, resiliency and fluid retentive properties of fine fiber construction, adapt it to high temperature conditions to +300°F. The packing is made firm and dense by means of a special process which eliminates large voids.

HERE'S PERFORMANCE PROOF:—Fluid handled: 45% H₂SO₄ (impure) at 170°F.—Operating conditions: 1¼" pump shaft at 1700 rpm. or 555 fpm. peripheral speed. Results: 46 days good service. Previous best service record 7 to 10 days.

Chemlon Yarn Packing Style C-30 is available in spool or coil form, in a wide range of sizes from 1/8" up. Can be lubricated with Teflon suspensoid or various types of lubricants.

Send for Bulletin No. P-321. Crane Packing Co., 6421 Oakton Street, Morton Grove, Ill. (Chicago Suburb). In Canada: Crane Packing Co., Ltd., Hamilton, Ont.

JOHN CRANE CRANE PACKING COMPANY
OFFICES IN ALL PRINCIPAL CITIES

When inquiring check CP 3101 opposite last page

RUSH!

**One (1) anti-corrosion rubber lining
...to fit 300,000 gallon storage tank!**

That's not an unusual order, and ARco does meet such requirements very promptly.

An ARco corrosion-preventing rubber lining or coating can be delivered right to your plant . . . anywhere in the country . . . ready to fit your equipment regardless of size. Yes, we do deliver the job packaged, literally speaking.

ARco Field Service Units come to your plant completely staffed, completely equipped to make your chemical processing equipment corrosion-proof . . . with advanced procedures and controlled rubber compounds.

The performance of ARco Field Service Units has proven dependable. This proof is their outstanding record of successes in combating corrosion, substantiated by savings in time and equipment realized by industrial management.

Don't wait, let us deliver the ARco package that will prevent this. Write, wire, or call for complete details on ARco Field Service. Automotive Rubber Company, Inc., 12566 Beech Road, Detroit 39, Michigan.

detroit • kalamazoo • houston



When inquiring check CP 3102 opposite last page

CORROSION

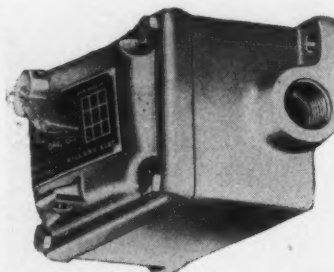
Explosion-proof switches made of aluminum alloy are corrosion-resistant . . .

metal is tough, lightweight, and non-sparking

Uses: For hazardous areas.

Features: Fittings are made of non-rusting Alumalloy, an aluminum alloy that is tough, lightweight, and non-sparking.

Description: Switches are available in both single and two-gang styles, in many hub styles. Boxes are supplied with mounting lugs, and toggle switches are



Explosion-proof switches resist corrosion

operated by a front handle, which can be easily locked in either the "on" or "off" position.

(Series XRT switches are a product of Killark Electric Mfg. Co., Dept. CP, Vandeventer and Easton Ave., St. Louis, Mo. . . or for more information check CP 3103 on the convenient Reader Service slip which is located opposite last page.)

Describes check valves for corrosive liquids

Special design and materials which fit check valve for handling corrosive liquids are discussed in two-page, two-color pamphlet. Alloys available and specifications are given.

Bul H-1 is issued by LaBour Co., Inc., Dept. CP, Elkhart, Ind. When inquiring specify CP 3104 on the convenient Reader Service slip which is located opposite last page.

PUMP

Liquids • Gases • Slurries
WITHOUT CORROSION OR CONTAMINATION



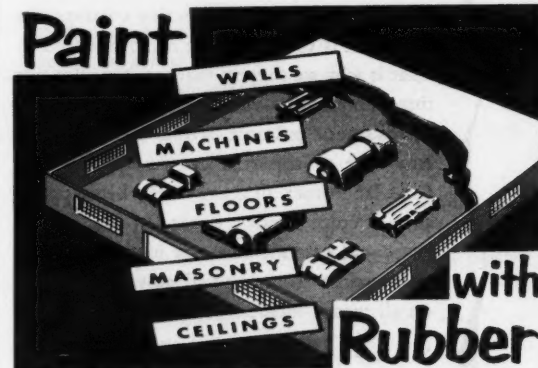
Prices range from . . . \$55 to \$500 depending on size of pump and accessory equipment required.

Write for Catalog

SIGMAMOTOR Inc.

18 North Main Street • Middleport, N. Y.

When inquiring check CP 3105 opposite last page



Going Places in Industry

Tropical Rubber-Base Paints

These tough rubber coatings resist acids, alkalis, fumes, moisture, mold, mildew, wear. Stop moisture travel; prime, seal, finish-paint new walls same day. Paint new concrete floors with 4-hour gloss; protect new masonry, inside and outside from moisture. Give machines an acid-resistant enamel finish! FREE! Your business letterhead request brings complete information. Write:

TROPICAL PAINT COMPANY
1128-1200 W. 70th, Cleveland, Ohio
HEAVY-DUTY MAINTENANCE PAINTS SINCE 1903
SUBSIDIARY OF PARKER RUST PROOF CO.

When inquiring check CP 3106 opposite last page

CHEMICAL PROCESSING

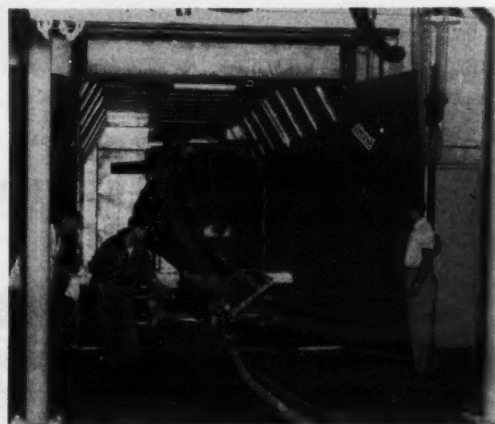
Corrosive chemical shipped in tank-trailer protected by fluorocarbon coating

Hauls sulfonic acid for leading manufacturer of detergents

A step forward in transportation of corrosive chemicals was made recently when a 4050 gallon highway tank-trailer — the interior of which is protected from corrosion with a fluorocarbon plastic coating — began hauling sulfonic acid for a leading detergent manufacturer.

The high temperature-resistant, chemically-inert coating is a Kel-F plastic dispersion. Coating was applied to the inside of the 33' tank-trailer in a large furnace.

Baking produces a tough, inert continuous coating

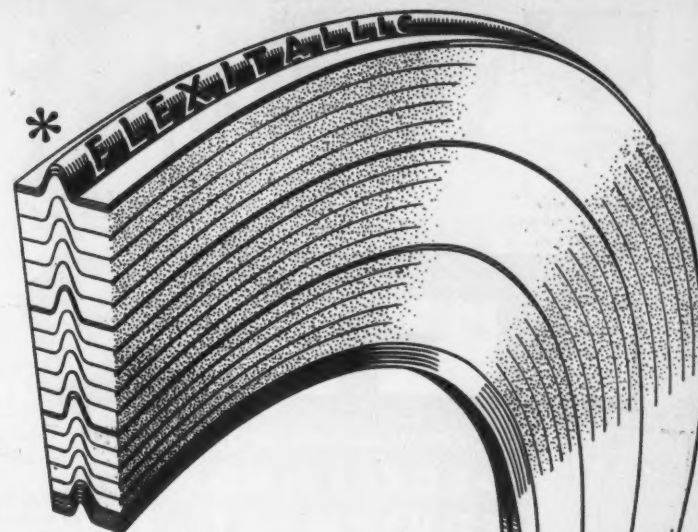


Tank-trailer being positioned in oven for baking of coating

with high resistance to temperatures approaching 400°F and low temperature flexibility. Coating has excellent resistance to corrosive chemicals, including alkalis, mineral acids, strong oxidizing acids, and solvents.

These properties make it possible to transport a number of other types of chemicals in tank-trailers coated in this way.

(Kel-F high temperature resistant, chemically-inert plastic used to protect interior of tank-trailer is a product of M. W. Kellogg Company, Subsidiary Pullman Inc., Dept. CP, 225 Broadway, New York 7, New York . . . or for more information about manufacturer's product reader may simply check CP 3107 on the convenient Reader Service slip which is located opposite last page.)



WHEN TO DEMAND THIS DYNAMIC SEAL

There's a time to *insist* on Flexitallic Gaskets and *this* is it:

- (1) When fluids are confined in critical pressure/temperature ranges
- (2) When flanged joints are subject to thermal and physical shock, corrosion, vibration, weaving and unpredictable stresses

Since 1912, Flexitallic has made only one product — a Spiral-Wound Gasket, built on the original Flexitallic principle. It's a uniquely resilient construction that compresses under the applied load, adjusts itself to changes in operating conditions without affecting gasket efficiency and then rebounds when bolting is relaxed.

That is why more and more engineers are marking their purchase orders: "Flexitallic — do not substitute."

Each Flexitallic Gasket is designed

FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

and engineered to meet specific conditions. Spirally-wound V-cripped plies of required metal with alternating plies of proper filler result in a resilient gasket having characteristics of a calibrated spring.

Flexitallic Gaskets are at highest efficiency when bolted up cold at a predetermined load. For all pressure/temperature ranges from vacuum to 10,000 lbs., from extreme sub-zero to 2000°F. For all standard joint assemblies. In four thicknesses for special requirements: .125", .175", .250", .285".

FLEXITALLIC GASKET CO.
8th & Bailey Sts., Camden 1, N. J.

Representatives in principal cities

Flexitallic
SPIRAL-WOUND GASKETS

**TEFLON FOR
PROCESS APPLICATIONS**

The ideal seal for many process applications is a Flexitallic Gasket with Teflon trapped between edges of stainless steel. Ask for folder, "Teflon in Flexitallic Gaskets."

*Flexitallic is a registered trade name. No one else can make a Flexitallic Gasket. Look for Flexitallic Blue—it's our exclusive blue-dyed Canadian asbestos filler.

When inquiring check CP 3108 opposite last page



Style A Kettle
Two-thirds Jacketed
5 to 300 gal.



Style B Kettle
Full Jacketed
10 to 300 gal.

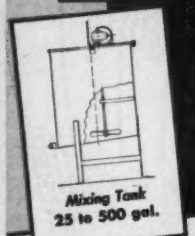


Style C Kettle
Two-thirds Jacketed
5 to 100 gal.

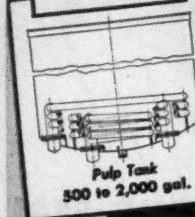
LEE

CORROSION-RESISTANT
**PROCESSING
EQUIPMENT**

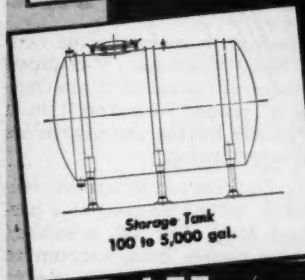
IS
PRECISION BUILT
TO YOUR
SPECIFIC
REQUIREMENTS
TO GIVE
LONG YEARS OF
PEAK PERFORMANCE
WITH
LOW MAINTENANCE



Mixing Tank
25 to 500 gal.



Pulp Tank
500 to 2,000 gal.



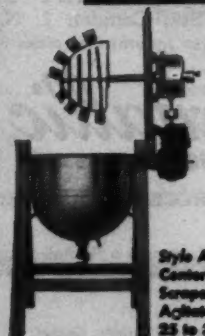
Storage Tank
100 to 5,000 gal.

WRITE
for technical
bulletins fully
describing
each of these
processing
units.

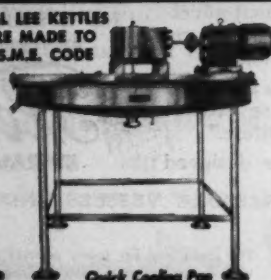
LEE METAL PRODUCTS CO., Inc.

418 Pine Street
Philipsburg, Pa.

ALL LEE KETTLES
ARE MADE TO
A.S.M.E. CODE



Style A3T
Center-line
Scraper
Agitator Kettle
25 to 300 gal.



Quick Cooling Pan
50 to 300 gal.



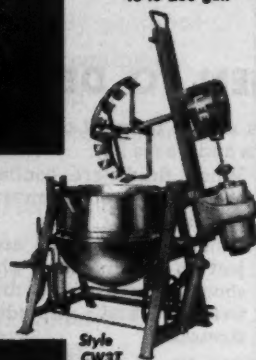
Vacuum Pan
50 to 500 gal.



Style CW
Kettle Two-thirds Jacketed
80 to 300 gal.



Pressure Kettle
Two-thirds Jacketed
40 to 200 gal.



Style
CW3T
Center-Line Scraper
Agitator Kettle
80 to 300 gal.

CORROSION

**Services up to 1500°F
withstood by alloyed
cast irons . . .**

technical paper covers various
alloy applications

While cast irons are generally not thought of as heat-resisting alloys, they can be used in some applications at temperatures as high as 1500°F. Laboratory tests were conducted on two important causes for failure of cast iron parts at high temperatures: 1) excessive growth and 2) deterioration by oxidation. Information on how cast irons have resisted these factors in various services follows:

Unalloyed cast iron is usually limited to service temperatures below 900°F. Low-alloyed irons are used satisfactorily up to around 1100°F. High-alloyed irons such as Ni-Resist offer economical elevated-temperature service up to 1200°F and higher.

Stress rupture and creep data show that Ni-Resist and Ductile Ni-Resist have appreciable load-carrying capacity at high temperatures, in contrast to unalloyed and low-alloyed cast irons. These data, together with the indications of good oxidation resistance of these special cast irons, suggest a wider use of these metals in high temperature service.

(Condensed from technical paper, "Cast Irons in High Temperature Service," by F. G. Sefing and R. J. Greene of The International Nickel Co., Inc., Dept. CP, 67 Wall St., New York 5, N.Y. Paper was presented at the 1954 annual Meeting of the National Association of Corrosion Engineers in Kansas City.)

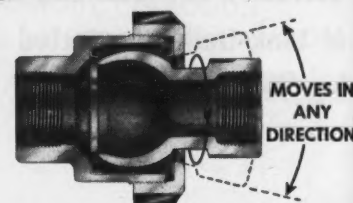
How to solder aluminum

Folder tells how to use and apply alloys and fluxes for soldering, brazing, and welding aluminum and its alloys. Form 51155 is issued by All-State Welding Alloys Co., Inc., Dept. CP, White Plains, N.Y. Check CP 3110 opposite last page.

BARCO

Flexible BALL JOINTS

—when
you need
movable
joints in
piping
handling



STEAM, OIL, CHEMICALS



Send for
New Bulletin
No. 215

- Provides for movement in piping—up to 40° side flexibility, plus 360° rotating movement.
- Stainless steel and chemically inert gaskets for strong chemicals. No metal-to-metal contact. Choice of body materials.
- One Barco Ball Joint does the work of two or more ordinary swivel joints because "it moves in any direction!"
- Many models available. For pressures to 7,500 psi; temperatures to 1000°F. 15 different sizes. 1/4" to 12". Ask for recommendations. BARCO MFG. CO., 537B Hough St., Barrington, Illinois.

THE ONLY TRULY COMPLETE LINE OF FLEXIBLE
BALL, SWIVEL, SWING AND REVOLVING JOINTS

When inquiring check CP 3111 opposite last page

NoDrip

...STOPS CONDENSATION DRIP



NoDrip PREVENTS RUST

— ANYONE CAN APPLY

NoDrip plastic coating is easily applied to tanks, containers, suction lines, vats, pipes, walls, ceilings, etc. NoDrip adheres to metal, concrete, brick, plaster. It forms a seamless 100% moisture-proof covering that is effective as soon as dry. Acid, alkali and brine resistant.

FREE...

Interesting 32-page
Handbook shows
what NoDrip is
and what it does.

SEND COUPON TODAY

SEND NoDrip HANDBOOK

NAME _____

ADDRESS _____

CITY _____ STATE _____

J. W. MORTELL CO. • 530-A BURCH ST. • KANKAKEE, ILL.
TECHNICAL COATINGS SINCE 1895

When inquiring check CP 3112 opposite last page

CHEMICAL PROCESSING

When inquiring check CP 3109 opposite last page

**Schedule 40 and 80 pipe
available in PVC . . .**

has excellent resistance to acids, alkalis, alcohols, other chemicals



Rigid PVC plastic pipe of the type to be marketed shown here installed in a chlorine drying and liquefaction plant. Large piping and valves are all of the PVC material

Rigid, nonplasticized, polyvinyl chloride pipe is available in schedule 40 and 80 pipe sizes. Fittings and valves of the same material also can be supplied. Material provides excellent resistance to attack of various acids, alkalis, salt solutions, alcohols, and other chemicals. Another advantage of material is that it will not support combustion.

(PVC pipe is product of Joseph T. Ryerson & Son, Inc., Dept. CP, Box 8000-A, Chicago 80, Ill. . . . or for more information check CP 3113 on form opposite last page.)

**Aluminum for everything
from air to acid**

Aluminum pipe — for conveying everything from air to acid — is described in 18-page, illustrated booklet. Characteristics and advantages for each major field of application are included. Specifications are provided, along with a description of appropriate fittings and methods of installation. Tables and graphs give performance data.

Bul AD 197 is issued by Aluminum Company of America, Dept. CP, 770 Alcoa Bldg., Pittsburgh 19, Pa. When inquiring specify CP 3114 on form opposite last page.

EXON: each resin engineered for a specific problem



EXON 481

specifically for

**CONSTRUCTION
COATINGS**



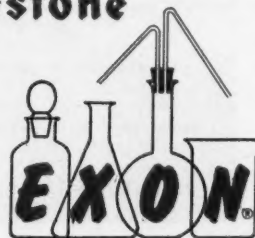
Site application of colorful, abrasion-proof coatings that last is now possible with the development of EXON 481 resin.

Simply sprayed on by a gun with 60 lbs. pressure over a prime coat, the stainproof, scuffproof sheeting dries the instant it is applied. Application is so quick and easy that the most complex shapes are no problem. No loose ends, seams, laps or joints.

EXON 481 has exceptional tensile strength — over 1000 lbs. per square inch with an elongation factor up to 200%. It is soluble in ketones, compatible with plasticizers, stabilizers and all pigment types.

As a result, coatings of the most decorative, attractive colors can be formulated. All completely washable, they ruggedly resist fading or cracking.

Firestone

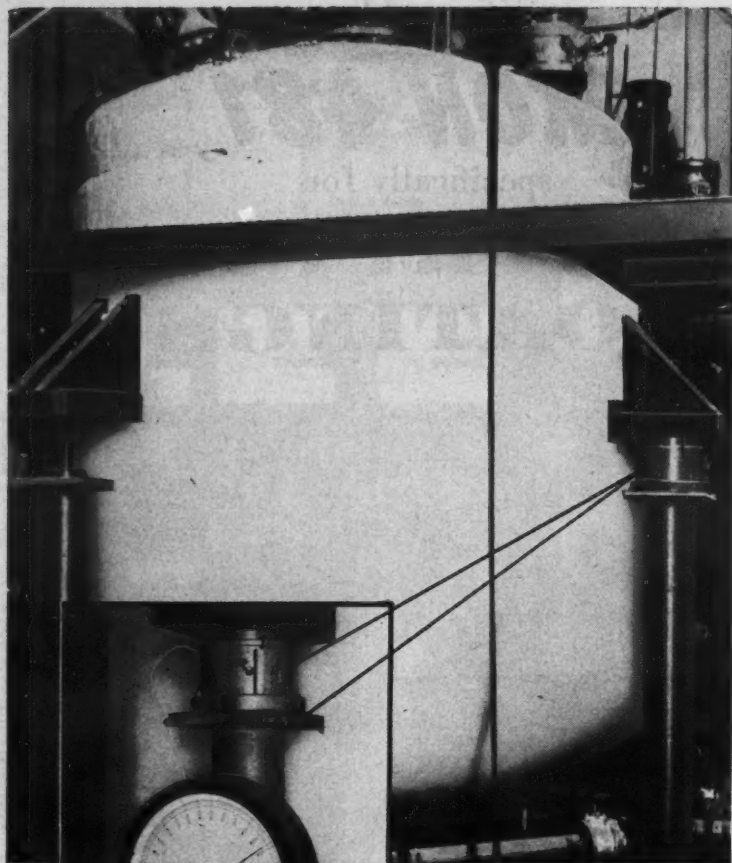


For complete information or technical service on EXON 481 and on all the resins in the ever-growing EXON line, call or write:

CHEMICAL SALES DIVISION

FIRESTONE PLASTICS COMPANY, DEPT. 68C, POTTSTOWN, PA.
DIVISION OF FIRESTONE TIRE & RUBBER CO.

When inquiring check CP 3115 opposite last page



Emery remote indicating tank weighing installation and (insert) Emery load cell and indicator — The B. F. Goodrich Co.

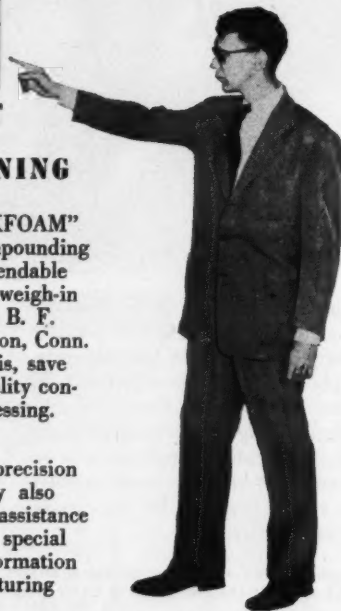
EMERY WEIGHS COMFORT INTO "TEXFOAM" CUSHIONING

The luxurious comfort of Goodrich "TEXFOAM" rubber cushioning depends on precise compounding of ingredients. Fast, accurate, utterly-dependable EMERY Tank Scales assure a pin-point weigh-in of ingredients at the processing tanks of B. F. Goodrich Sponge Products Division, Shelton, Conn. Emery tank weighing systems, such as this, save time, money — improve accuracy and quality control in batch or continuous product processing.

Emery manufactures a complete line of precision weighing equipment of all types. Emery also offers practical, experienced engineering assistance in designing weighing systems to meet special requirements. Write us today for full information on "Weight Control" for your manufacturing and processing operations.

THE A. H. EMERY CO., NEW CANAAN 15, CONNECTICUT

When inquiring check CP 3116 opposite last page



material handling



Nylon track on bottle conveyor has "built-in" lubrication.
By using it, Peter Hand Brewery Company is able to . . .

put worn conveyors in better-than-new condition

*Installation of nylon track
is almost as easy as dropping
it in place. Once in, it cuts
lubrication needs drastically,
gives smooth, quiet operation,
and cuts breakage due
to jerky start-up when line
is put in operation*

Problem: Peter Hand Brewery Company of Chicago was bedeviled by all the small troubles that crop up in bottling operations: jerky starts which topple and break bottles, nuisances of keeping conveyors properly lubricated . . . and relubricating after clean-up. In addition, of course, there was normal maintenance on steel links and tracks as they wore. One particularly troublesome spot was a can-filling line where no lubrication could be used because of the possibility of off-taste if lubricant were left on can lip.

Solution: In April of 1954 Peter Hand brewery, home of *Meister Brau* began experimenting with nylon link chains and nylon tracks for use with standard steel links. Because of its self-lubricating prop-



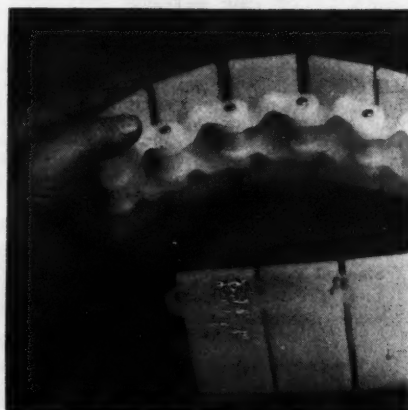
Bottling lines use steel link chain riding on nylon rails while cans ride on a chain made of nylon links

erty, it was thought that nylon could reduce at least the lubrication problem. Though some other plastics (like Teflon) are also self-lubricating, nylon is particularly suitable because it does not soften from heavy pressure and stands heat until temperatures very near its melting range are reached. Thus it can stand up to live steam for cleaning and sterilization and also to continuous wear or pressure without losing its shape or working efficiency.

While perfecting nylon link design required some hard work, conveyors using these links were put in service. They did not develop too many bugs.

Nylon track, on the other hand, required some work to make it practical and easily installed. Since nylon does absorb a small amount of water, making it swell slightly, a method had to be worked out to allow for expansion.

(Please turn to page 101)



Underside close-up of nylon link chain shows construction



Single pin in conjunction with mortise-tenon joint, holds nylon rail in place on conveyor bed



BOXES ARE YOUR AMBASSADORS



CORRUGATED AND SOLID FIBRE BOXES
FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES
KRAFT BAGS AND SACKS

Modern Gaylord containers reflect the excellence of the product they carry. As they travel they create a quality impression throughout your channels of distribution. This builds selling and buying confidence.

For full facts on the merchandising possibilities of handsome, new Gaylord Containers call your nearby Gaylord office.

GAYLORD CONTAINER CORPORATION • ST. LOUIS

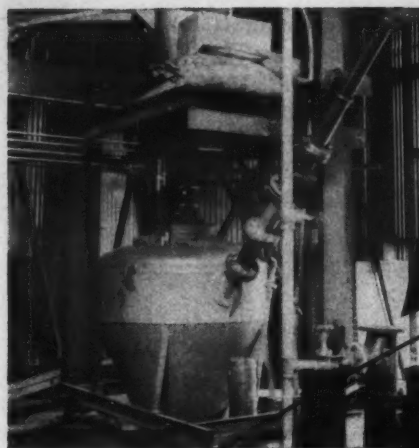
DIVISION OF CROWN ZELLERBACH CORPORATION

When inquiring check CP 3117 opposite last page

Robinson

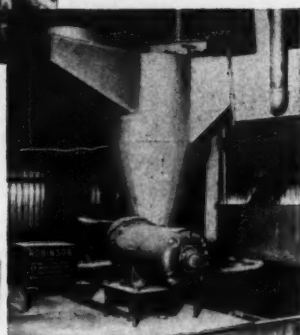
Air-Activated

Conveyor System



One Highlight
of this
**LYNCHBURG
FOUNDRY
Installation**

**Remarkably Accurate
Batches of Sand
Automatically Weighed
and Transported**



By "remarkable accuracy" we mean within 1 to 3 pounds in 1,000... an accuracy made possible by the System's use of the Baldwin Electronic

Load Cell weighing unit, which can be set for any demand batch in weights up to 2500 pounds.

Actually, there are two Robinson Systems at Lynchburg. One, with the Activator Unit located under the hopper-car unloading station, conveys Pennsylvania Glass Sand (120 AFS) to the storage bins. The second unit weighs and loads sand automatically from these bins on demand and transports the weighed batch to the muller line. It takes about 1 minute to weigh and transport one batch. Air consumption is less than 1/2 cubic foot of free air per pound of sand conveyed.

Why not send us an outline of your proposed or existing sand and binder handling requirements and let's see what the Robinson System can offer? If you purchase a Robinson System, you will be doing what Ford-Dearborn, Ford of Canada, U.S. Steel (Edgar Thompson Works) and others have done to their advantage.

ROBINSON

Air-Activated

A Division of
Morse Boulder Destructor Co.

CONVEYOR SYSTEMS

80-T FIFTH AVENUE • NEW YORK 11, N. Y.

Representatives in Principal Cities

When inquiring check CP 3118 opposite last page

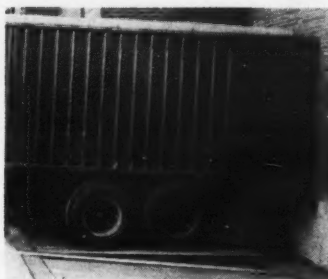
MATERIAL HANDLING

**Truck bed, dock meet
with push-button
ease...**

leveler is designed for installation where space is limited

Uses: Raises or lowers over-the-road truck beds to meet loading dock level.

Features: Unit is useful where dock space is limited. It utilizes existing pavement area and solves problem of varying dock and vehicle heights without extensive alterations.



Leveler, with 20 ton capacity, is positioned by push-button control

Description: Leveler has capacity of 20 tons, with standard units measuring 12 feet in length.

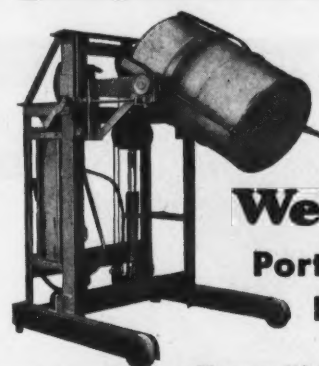
Widths of either nine or ten feet are available. Dock is constructed of 1/2" nonskid steel floor-plate. Framework is welded and reinforced with "X" frame on underside for torsional stability.

Unit can be raised or lowered with vehicle on its platform, or trucks can be driven onto it without prior adjustment. Ramp is positioned by push-button control in a matter of seconds.

(Leveler is product of Rowe Methods, Inc., Dept. CP, 2534 Detroit Ave., Cleveland, Ohio. Check CP 3119 on form opposite last page.)

Your guide... to more material handling ideas and equipment is the alphabetical product directory beginning on page 178 in this issue

Simplify, Speed Up DRUM HANDLING



with
New

Weld-Bilt
**Portable Drum
Elevator**

"Weld-Bilt"
PRODUCTS

You can lift, transport, store and DUMP all sizes of drums faster, easier, with this new WELD-BILT Portable Drum Elevator. Unique worm-gear tilting mechanism makes "last-drop" dumping safer, more efficient, with minimum effort. Lift, electric-hydraulic operated, is also available for hand operation or fully electrified. Jack-up type steering permits easy, safe positioning.

Write for prices on
this important time
and labor-saver.

WEST BEND EQUIPMENT CORP.
MATERIALS HANDLING ENGINEERS

322 Water Street, West Bend, Wisconsin

When inquiring check CP 3120 opposite last page



Let PIONEER's "Hand Protection Clinic" help. Send (Attn: Hand Protection Clinic) a complete job description on your company stationery, including dexterity and abrasion resistance requirements, and complete description of chemicals or solvents used. Our solution of your glove problem will assure you of maximum worker protection and comfort at the minimum cost.

Complete PIONEER Catalog available on request

New Flock-lined Neoprene Stanzoil Glove withstands oils, acids, greases, caustics and solvents. Combines dexterity with comfort.

the PIONEER Rubber Company

241 Tiffin Rd. • Willard, Ohio, U.S.A.

Pioneers in Industrial Hand Protection For Over 35 Years

When inquiring check CP 3121 opposite last page

CHEMICAL PROCESSING

NYLON TRACK



With steel links removed, nylon rails in place look like this

(Continued from page 99)

Tracks in service at Peter Hand brewery today are held to the bed with a single nylon pin extending from the bottom of each section. This pin is located near the "upstream" end of the section. At the same end of the track section is a mortise. Tenon at other end of section dovetails in this mortise with a $\frac{3}{8}$ " end clearance. Since each section is fastened to track bed at one end and the next section at the other, no side shift can occur. At the same time track sections are free to expand or contract in their normal range without buckling. Furthermore, nylon surface presented to the sliding links is continuous.

Thickness of track ($\frac{1}{8}$ "") can be used to advantage — nylon tracks can be applied to steel tracks that have been worn down. Instead of replacing these steel tracks, nylon strips are installed over them. This operation is a fairly simple one because of the method of attachment.

Results: Difference between nylon lines and steel lines can actually be seen in places where they run side by side. Links riding on nylon track run smoothly while links of conventional conveyor seem to inch or jerk slightly in normal operation. Lubrication costs (a not-so-insignificant factor considering special soap lubricants used) have been cut drastically. It has been found, in fact, that "nyloned" conveyors will perform well with no lubrication at all.

Finally, start-up on nylon track conveyors has been found to be so smooth that bottles can be left standing on the line during start-up.

Peter Hand is planning on equipping most, if not all, of its bottle conveyors with nylon track as steel track wears down.

(Nylon track sections were developed and furnished by Penco, Inc., Dept. CP, 125 N. Racine, Chicago, Ill. . . . or check CP 3122 opposite last page.)

New PAYLOADER®

Model HAH

Bucket Capacity — 1 cu. yd.
Lifting Capacity — 4,000 lbs.
Carry Capacity — 3,000 lbs.
Breakout Force — 4,500 lbs.
Torque Converter Drive
Power Steer



Which best fits your needs?

New PAYLOADER®

Model HA

Bucket Capacity — 18 cu. ft.
Lifting Capacity — 3,000 lbs.
Carry Capacity — 2,000 lbs.
Breakout Force — 3,000 lbs.
Torque Converter Drive



Now, Hough, the pioneer and leader in the tractor-shovel industry, gives you a choice of two new, more productive "PAYLOADER" units. Both have front-wheel-drive and rear-wheel-steer — especially designed for stockpile work and fast material moving in close quarters. They're the finest of their type in Hough

history — they're both way ahead of the field in design, performance and all-round value.

FEATURES of these outstanding new models include: 40° bucket tip-back at ground; torque converter drive; full-reversing transmissions; closed, pressure-controlled hydraulic system; large hydraulic brakes; accumulator in hydraulic system that prevents pressure shocks and facilitates bucket control; power steer on model HAH.

Your nearby "PAYLOADER" Distributor is eager to show what these new machines can do for you.

Use the coupon below to get full information on any "PAYLOADER" model



PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

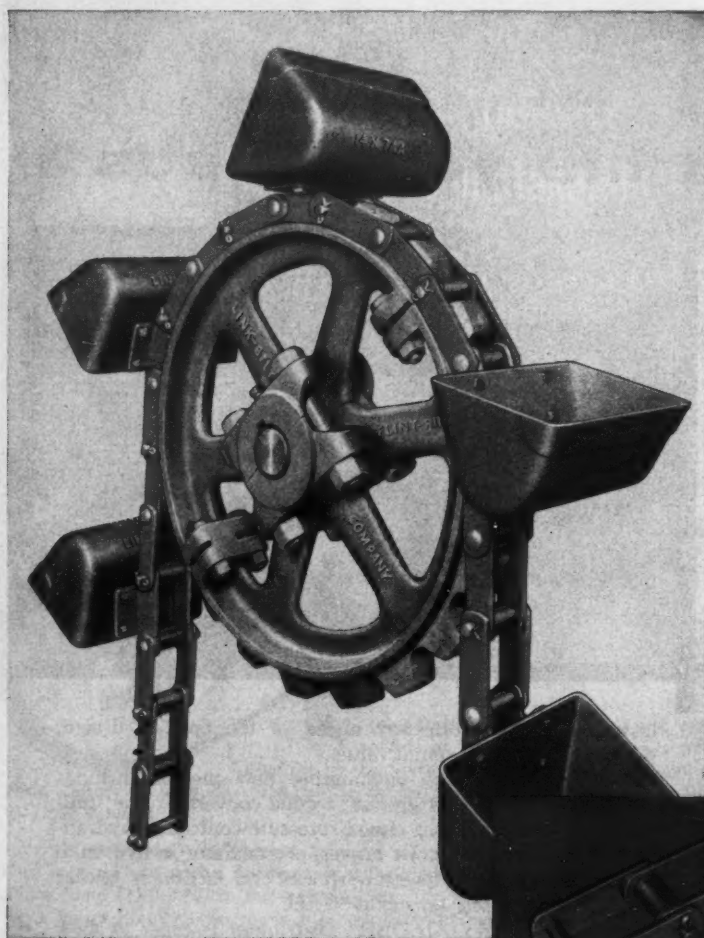


THE FRANK G. HOUGH CO. • 744 SUNNYSIDE AVENUE • LIBERTYVILLE, ILLINOIS		
Send data on "PAYLOADER" units Model HA <input type="checkbox"/> Model HAH <input type="checkbox"/> larger sizes <input type="checkbox"/>		
Name	Title	Firm
Street	City	State

When inquiring check CP 3123 opposite last page

4 times the life... 1/4 the maintenance

through proper selection of LINK-BELT chain



Bucket elevator at fertilizer plant proves advantage of choosing from this complete line

Often there's no need to go to excessively costly cast special alloy chains to get long life. Here's proof: In an Indianapolis fertilizer plant, Link-Belt SS-111 bushed chain (left) handled an average of 75,000 to 80,000 tons of fertilizer before requiring replacement. The previous type of chain had to be replaced after handling 18,000 tons.

This installation is an example of the efficiency and economy that can be gained by applying the one chain best suited to specific conditions from the complete Link-Belt line. Remember, no other single source offers you such a broad range of roller, silent, cast, combination, forged and fabricated chains . . . with matching sprockets.

A call to your nearby Link-Belt office or authorized stock-carrying distributor will bring you all the facts about the complete line of Link-Belt chains and sprockets.

Under severely corrosive conditions, Link-Belt SS chain on bucket elevator of this type in fertilizer plant handled 80,000 tons, to previous chain's 18,000.

Looking for the best
chain for a specific
need? Link-Belt makes
the complete line.

LINK-BELT
CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.



800 Lay
bushed chain



Class C
combination chain



LXS steel
chain



"Flint-Rim"
cast sprockets

MATERIAL HANDLING

Bag patching saves time, money, mess

On-the-spot patching permits repair without
breakdown of pallet

An accidental tear in a multi-wall bag, such as used in bagging of powdered or pelletized materials, fertilizers, or various chemicals, means trouble any time. But when the torn bag is one of a neatly-tiered pallet-load, it can mean a major project — spillage to be cleaned up, aisles blocked, and time lost.

Suggested remedy is to use pressure-sensitive tape for convenient and permanent repair. Recommended



Patching of palletized bags saves trouble, money

repair method: brush away dust which will inevitably surround the break, then apply tape patch directly over the tear to stop flow of material from the bag. Next, clean whole area with a damp (not wet) cloth and allow about 30 seconds for drying. Then apply a final piece of tape, or several pieces, for a complete and permanent repair.

(Number 131 Behr-cat Flatback Tape is manufactured by Behr-Manning Div., Norton Company, Dept. CP, 933 Sidford St., Troy, N. Y. . . . Check CP 3125 opposite last page.)

Gives data on pipe made by spinning

Two-page illustrated data sheet has engineering drawings and specifications for spun-cast pipe. High chrome alloy properties are described.

Data Sheet Wa is issued by The Allen-Sherman-Hoff Co., 259 E. Lancaster Ave., Wynnewood, Pa. Check CP 3126 opposite last page.

When inquiring check CP 3124 opposite last page

MATERIAL HANDLING

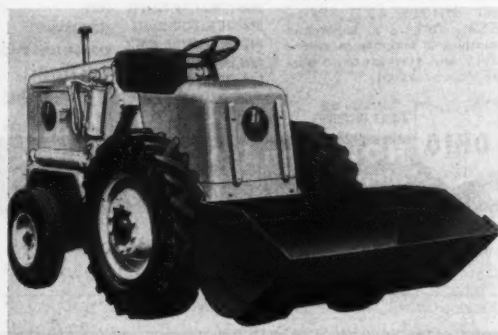
Automatic transmissions aid tractor-shovel operation . . .

units employ "pry-out" action — relieve stress on axles, wheels, hydraulic system

Uses: Units designed for bulk handling of materials. Model HAH is particularly suited for stock pile work.

Features: Shovel's "pry-out" action, accomplished by using breakout pads on the ground as a fulcrum for leverage, reduces load on axles, wheels, and hydraulic system.

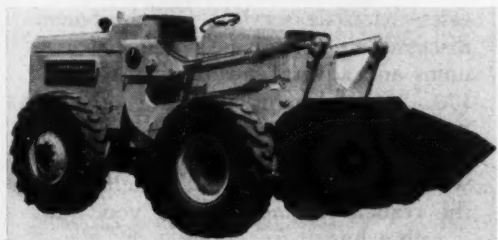
Description: Model HAH, with heaped capacity of 1 cubic yard, has breakout force of 4500
(Please turn to page 105)



Bucket arm design permits carrying of heaped loads at lower level



Unit has lifting capacity of two tons



Transmission on model HO units permits gear changes without slowing

when **Sanitation** is important

in handling dry materials in bulk

. . . call on

Fuller

. . . pioneers in harnessing AIR

No more clogged conveyors, product losses, dusty workrooms or disgruntled inspectors when you rely on Fuller conveying systems to move dry pulverized or granular materials from Receiving to Storage to Process, thence to Shipping.

The right combination of Fuller-Kinyon, Airveyor, Airslide and Fuller-Fluxo systems, engineered by Fuller and installed in your plant, will end forever the chances you may have been taking with product contamination. Completely enclosed Fuller systems keep out all foreign matter, speed transport of dry materials in bulk from Receiving and throughout your plant.

First step toward improved plant cleanliness: write for Fuller's informative brochure, "How to Pull Dollars Out of Thin Air." Do it today.



Fuller

pioneers in harnessing AIR

1845
G-116

FULLER COMPANY

136 Bridge St., Catasauqua, Pa.

GENERAL AMERICAN TRANSPORTATION CORPORATION SUBSIDIARY
Chicago . San Francisco . Los Angeles . Seattle . Birmingham

When inquiring check CP 3127 opposite last page

**TAYLOR-WHARTON
GAS TRANSPORTS**



—for flexibility in handling the newer gases

Taylor-Wharton Gas Transports are designed for transportation and storage of compressed gases in bulk. For this purpose the transport offers convenience and economy that merit the attention of cost-minded management. The Transport is a flexible means of moving the gas supply from one location to another. Process plants using large quantities of ethylene, hydrogen chloride, boron trifluoride and other relatively new commercial gases, as

well as oxygen, nitrogen, hydrogen and other common gases, find Transports the answer to this newly developed need. Among other uses, Transports have displaced some large, permanent storage installations, with less investment and more mobility. The tubes meet ICC-3A2400 specifications and are completely heat-treated. The trailers are specially constructed for this service in single and double axle models.

Ask us for further
information, describing
your requirements.

Taylor-Wharton Division
Harrisburg Steel
CORPORATION HARRISBURG 24
PENNSYLVANIA
More than a century in Harrisburg

When inquiring check CP 3128 opposite last page

Automated liquid handling depends on meters



SPECIFY THE
INDUSTRY-
PROVED
BOWSER

XACTO
Widest selection
of models for
every plant...

Choose from the world's leading, most widely used line. XACTO meters are easily adapted with choice of dials and controls for changing needs to speed liquid handling operations and provide accurate accounting.

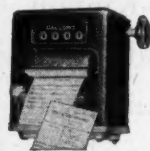
**GET ALL THE DATA YOU NEED NOW
...WRITE...**

BOWSER
ESTABLISHED 1885

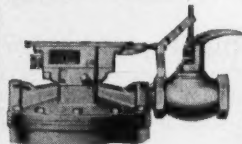
BOWSER, INC., FORT WAYNE, IND.

1315 E. CREIGHTON AVE.

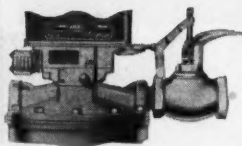
When inquiring check CP 3129 opposite last page



Recording printer mounts on
meter. Prints quantity dis-
pensed or received.



Delivers predetermined
quantities up to 10,000 gal-
lons, then shuts off.



A repeating control for de-
livery of predetermined
quantities. Automatic. With
or less recording printer.

MATERIAL HANDLING

**Protects machinery, product
by removing tramp iron**

Uses: Magnetic plates prevent product contamination, protect processing machinery from damage by tramp iron. Removal of ferrous contaminants also guards against fires and explosion caused by accidental sparking.

Features: Compact units may be permanently mounted on pipes,



Permanent magnets attach to
pipes, chutes, belts and most
other conveying equipment

chutes, belts, and most other types
of conveying equipment.

Description: Permanent mag-
nets, standard mounting or hinged,
are available with various numbers
of gaps, depending on requirements.

(Magnetic plates are products of
Homer Manufacturing Co., Inc.,
Dept. CP, 142 E. Pearl Ave., Lima,
Ohio. . . or check CP 3130 oppo-
site last page.)

**Gives engineering data
on monorails**

Featuring engineering and ap-
plication data, 12-page booklet
in two colors includes stress
analyses of overhead monorail
tracks. Also included in booklet
is material on the subject of
track peening. Track switches,
carriers, tractors, cranes, trans-
fer cranes, interlocks, discharge
points are described and illus-
trated.

Booklet 2008-L is issued by
Cleveland Tramrail Div., The
Cleveland Crane & Engineering
Co., Dept. CP, 8008 E. 289th
St., Wickliffe, Ohio. When in-
quiring specify CP 3131 on
form opposite last page.



Material Handling Equipment

**New
OHIOLITE
HOISTS**

light weight
modern design
high speed
high efficiency
aluminum alloy frame
alloy coil chain
corrosion resistant

OHIOLITE HOISTS...newest,
lightest aluminum alloy spur
geared hoists. Available in ca-
pacities from 1/4 ton.

OHI CORROSION RESIST-
ANT HOISTS AND TROL-
LEYS...for use in hazardous
atmospheres and places where
safety and resistance to cor-
rosion are essential.

OHI COM-A-LONG PULLERS
BOB CAT ELECTRIC HOISTS
PORTABLE ELECTRIC HOISTS
OHI CHAIN HOISTS
CONSTRUCTION WINCHES
PLAIN, GEARED AND MOTOR-
DRIVEN TROLLEYS

LIFTS
HOIST CHAIN
HAND-OPERATED WINCHES
FLOOR CRANES
OVERHEAD CRANES
LOAD BINDERS



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West Coast Office: 461 Market St., San Francisco, Calif. + EXbrook 2-3233

When inquiring check CP 3132 opposite last page



**alphabetical index
on page 178**

... for alphabetical index of all pro-
cesses, materials, services, and equipment
discussed in this issue's editorial col-
umns and advertisements, turn to page
178. "Quick-locator" starting on that
page was a feature in **CHEMICAL
PROCESSING** years ago. It means extra
work for the Editors, but it helps you,
the reader, in finding what you want
... in a hurry!

MATERIAL HANDLING

(Continued from page 103)

pounds, lifting capacity of 4000 pounds, and carries 3000 pounds at 4 mph. Unit is equipped with torque-converter drive and four-speed, full-reversing transmission. Fifty-seven hp gasoline engine permits speeds to 14 mph forward and to 23 mph in reverse. Bucket arm design permits carrying of heaped loads at low level. Stability is improved through use of hydraulic accumulator which absorbs load shocks.

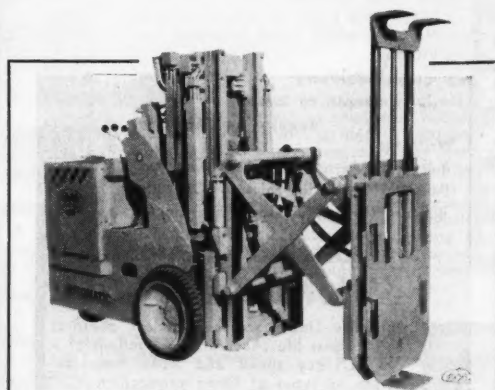
Transmission on Model HO permits shifts through all speed ranges in both forward and reverse without stopping or slowing down.

(Models HAH and HO shovel-tractors are manufactured by The Frank G. Hough Co., Dept. CP, Libertyville, Ill. . . or for more information check CP 3133 on form opposite last page.)

Describes check weight scale for up to 15 units/min

Two-page data sheet describes check weigher using strain-gage load cell weight transmitter and belt conveyor. Scale unit described automatically prints item number and weight on dual tapes at up to 15 units/min.

Catalog 21 is issued by Weighing Components, Inc., Dept. CP, 64 Fulmor Road, Hatboro, Pa. Specify CP 3134 on form opposite last page.



Pincer movement . . .

. . . of clamping device permits precise handling of crates and large, rigid boxes. Unit has lift of 107 inches, is equipped with side-shifting device which permits exact placement next to walls, and can reach 24 inches.

(Extendable crate clamp, developed for Automatic Skylift Electric Trucks, is product of Automatic Transportation Co., Dept. CP, 149 W. 87th St., Chicago 20, Ill. . . or check CP 3135).

NOW—A Low-Cost, All-Purpose Motor Grader for Industrial Use

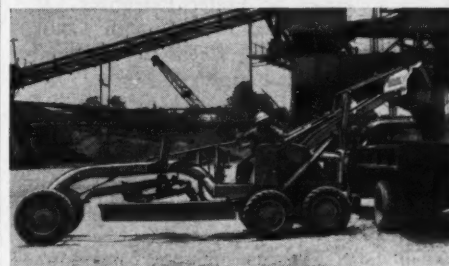
Outstanding ability, almost unlimited versatility, and original cost only one-third that of a large grader, all help make the Model D an ideal machine for use around industrial plants.



HANDLES CONSTRUCTION of roads, parking lots, plant yards. It grades, backfills, levels and landscapes, cuts and cleans ditches, scarifies with plenty of down pressure, works and spreads oil mix — has the power and capacity to do a wide range of construction jobs.



MAINTAINS ROADS AND YARDS. The Model D smooths out access roads, plant drives, storage yards, parking lots. It removes weeds and brush, handles patching work, reshapes and maintains shoulders—keeps roads and yards in shape the year round.



STOCKPILES, LOADS sand, dirt, any bulk material or feeds conveyors with $\frac{5}{8}$ -yd hydraulically-controlled bucket. Dumping height of 8 ft, 8½ in. allows easy loading of high truck bodies, hoppers, bins.

LET YOUR DEALER DEMONSTRATE how the economical Model D can handle a variety of jobs for you — or send for complete information.

Choice of Two Models

	Diesel	Gasoline
Brake hp	50	50
Weight	9,350 lb	8,800 lb
Speeds to	25.2 mph	25.6 mph



The Allis-Chalmers MODEL D



CLEARs AWAY SNOW from large areas, sidewalks, drives — helps keep winter operations on schedule. (Above) The Model D moves snow with interchangeable, hydraulically-controlled V or blade-type plow or with regular moldboard. (Below) With rear-end loader it carries snow or loads it to trucks.



Features Behind the Model D's Outstanding Ability

PLENTY OF POWER. Modern 50 brake-hp "POWER-CRATER" engine provides unusual lugging ability even at part throttle for best all-round performance. Choice of gasoline or diesel power. Engine is not only powerful, but dependable and economical to use. Parts and service available everywhere.

BIG-GRADER ADVANTAGES include single-member tubular frame that absorbs stresses and strains, ground-gripping tandem drive for best traction, hydraulic blade lift to make operator's work easier, ROLL-AWAY moldboard for moving more dirt with less effort.

SPECIAL FEATURES HELP PERFORMANCE. (optional equipment). Leaning front wheels make possible better control, greater handling ease. Hydraulic blade shift speeds work around obstructions, power circle turn permits turning blade up to 135 degrees with easy lever control.

POWER-CRATER and ROLL-AWAY are Allis-Chalmers trademarks.

ALLIS-CHALMERS



When inquiring check CP 3136 opposite last page



Oils go "direct-from-drum" to mixing kettle at Johnson's Wax

At the modern S. C. Johnson & Son, Inc., plant in Racine, Wisconsin, an air-operated Graco Fast-Flo drum pump, mounted directly into bung opening of the original drum, transfers oil to the mixing kettle.

Since the mixing of ingredients for wax products must be closely controlled, the quick "start and stop" of the Fast-Flo pump fits the process perfectly.

Johnson's Wax uses Fast-Flo pumps regularly to transfer oils, solvents, etc., received in drums. Drums stand upright, in safe handling position, with leakage or spillage minimized.

If your company receives fluids in original drums, there's a good chance the Fast-Flo pump can simplify an operation and save time and dollars. Use it for transfer, dispensing, applying, mixing or spraying. This economical "direct-from-drum" pump is light in weight, and it screws or clamps easily into working position.

We invite you to get an idea for your own plant from the 24-page Graco Fast-Flo application booklet. Full of dollar-saving ideas! Write for your copy today.

• Graco products are sold and serviced through authorized distributors in all principal U. S. and Canadian trading areas and in 63 foreign countries. Your nearby Graco distributor can give you helpful personalized service. Call him.

GRACO

air-powered
"DIRECT-FROM-DRUM" PUMPS

GRAY COMPANY, INC. 12 GRACO SQUARE, MINNEAPOLIS 13, MINN.

FACTORY BRANCHES: NEW YORK • PHILADELPHIA • DETROIT • CHICAGO • ATLANTA • SAN FRANCISCO

GRACO...

Engineers and Manufacturers of air-powered paint circulating systems and heavy material pumps, drum pumps, lubricating and automotive service equipment

When inquiring check CP 3137 opposite last page

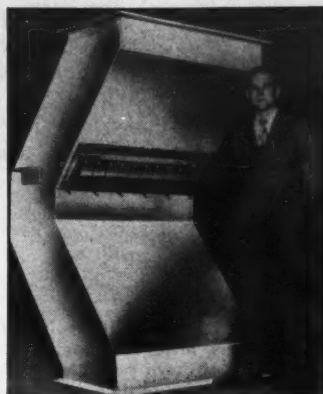
MATERIAL HANDLING

Magnets make two passes at tramp iron

Uses: Separation of tramp iron and other metal particles from flow of crushed or finely ground materials.

Features: Material flows past one magnet, reverses direction, then flows past second magnet.

Description: Chute contains two permanent magnets. Magnets are self contained and are hinged



Units are available in 8 to 48" widths

so that trapped pieces of metal can be easily cleaned merely by opening unit. Separator is of welded construction and is dust tight. Unit is made only for gravity flow. Sizes available range from 8 to 48" in width.

(Zig-Zag magnetic chute is produced by Prater Pulverizer Co., Dept. CP, 1515 S. 55th Court, Chicago, Ill. Check CP, 3138 opposite last page.)

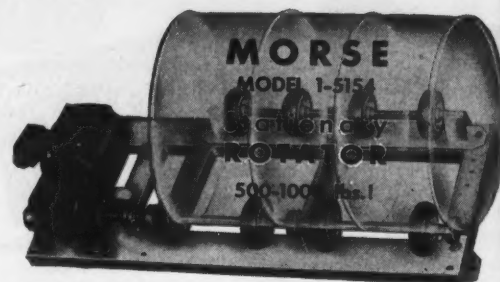
Expels air from bags, eases palletizing...

speeds of upper and lower decks are synchronized

Uses: Flatteners squeezes air from bags, giving them uniform size and shape — aids in palletizing and handling.

Features: Upper and lower decks are individually powered, driven at synchronized speeds.

HEAVY DRUM ROTATING



Cuts Costs . . . Fast . . . Safe

You can now mix, blend or tumble loads up to 1000 lbs. with the new MORSE Model 1-5154 Stationary ROTATOR. It is primarily engineered for heavy loads in 30 to 55 gallon drums yet lesser loads can be rotated with equal efficiency. Any diameter drum can be mounted by adjusting only three bolts.

The rugged ½ H.P. motor can be geared to give any fixed speed from 5 to 30 RPM. Six inch drive wheels (4) and idler wheels (4) have Neoprene treads for smooth, non-slip revolving. Drive shaft, idler shaft and all welded steel frame are extra rugged construction for long-lasting, trouble free operation.

A double drum model No. 2-5154 with a 2000 lb. capacity is also available. Write today for brochure on complete Morse line.

MORSE MANUFACTURING CO. INC.
757 West Monius St. East Syracuse, N. Y.

When inquiring check CP 3139 opposite last page

ACCURATE

Lumenite Electronic LIQUID LEVEL CONTROLS

With no floats—no moving parts in the container (except non-conductive liquids) these Lumenite Electronic Liquid Level Controls maintain exact levels of water, milk, syrups, etc., in tanks, reservoirs, boilers, processors, freezers — either open or under high pressure.

Clean—Sanitary
Simple to Install
Require no Servicing

Write for
Bulletin FLM—on Liquid Level Controls
Bulletin ITC—on Ice Thickness Controls
Bulletin FN—on Non-Conductive Liquids

DEPENDABLE




Lumenite Automatic TIMING CONTROLS

Lumenite Timers are the simplest, sturdiest and longest life. Accurate to fractions of a second, they speed and make more accurate all types of timed production.

For Details ask for
Bulletin LT—Standard Time Switches
Bulletin CR—Cycle Repeating
Bulletin PC—Program Clocks
Bulletin R—Time Delay Relays
Bulletin RMC—Auto. Reset Timers
Bulletin ET—Electronic Timers
Electronic or Electric Controls
and Timers designed for special service.

Lumenite Electronic Company
407 S. Dearborn St., Chicago 5, Illinois

When inquiring check CP 3140 opposite last page

CHEMICAL PROCESSING

HERE'S HELP!

**CATALOG SHOWS
HOW YOU CAN
CUT COSTS**

and solve handling
problems with

**Hapman
TUBULAR
CONVEYORS**
for wet or dry
bulk flowable
materials

—metal chips—chemicals—foods

A fact-packed catalog—shows application and advantages of Hapman Chain-Flight Tubular Conveyors.

REQUEST YOUR COPY OF CATALOG C-16

Details of new metal-belt PAN-LINK Conveyor for bulk chips, turnings, broken glass, etc., available on request.



Hapman CONVEYORS, INC.
DIVISION HAPMAN DUTTON COMPANY

KALAMAZOO MICHIGAN

In British Commonwealth & Europe: Fisher and Ludlow Ltd., Birmingham

When inquiring check CP 3141 opposite last page

FOR MAXIMUM SAFETY

all
over
your
plant
use

**Safety
GRIP-STRUT**

Pat. Pending

the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety grip-strut presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive non-slip footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

Important Safety Features

- ★ Fire proof
- ★ Slip proof
- ★ Maximum strength
- ★ Minimum weight
- ★ Easy to stand on
- ★ Cool in summer—warm in winter

Big Economy Features

- ★ For balconies—no extra light needed below—no extra heat.
- ★ No secondary sprinkler heads needed
- ★ Self-cleaning
- ★ Cut and installed like lumber by your own maintenance force
- ★ Low in original cost
- ★ No extra supports necessary—channels are integral part of the material

Distributors in all principal cities. Consult yellow pages in phone book under "GRATING."

GRIP-STRUT division

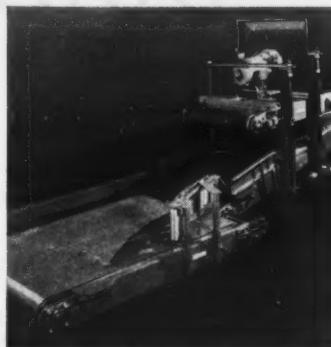
THE GLOBE COMPANY • Manufacturers since 1914
4006 S. PRINCETON AVE. • CHICAGO 9, ILL.

When inquiring check CP 3142 opposite last page

JANUARY, 1956

MATERIAL HANDLING

Description: Tensions can be adjusted to meet individual needs. The power-driven tail unit is designed so that bags may be fed at right angles or straight through.



Upper and lower decks are driven at synchronized speeds by separate power units

Equipment is furnished in various widths. Different power units are available as requirements dictate.

(Bag flattener is manufactured by Sage Equipment Co., Inc., Dept. CP, 30 Essex St., Buffalo 13, N.Y. Check CP 3143 on form which is located opposite last page.)

**Motor driven, wagon
carries 26 tons . . .**

bottom-dumping arrangement is used

Uses: For transporting large amounts of bulk material in outdoor service such as storage piles.

Features: Twenty-six-ton rating is based on a 17-cubic-yard struck capacity. Wagon will carry 22 cubic yards heaped.

Description: Large dump wagon is powered by 280-hp diesel engine. At 2100 rpm this provides forward speeds from 3 mph in low gear to 20 mph in fourth.

Overall length of wagon is 35' 10 1/2", width is 11' 3 3/4". Wagon stands just over 10 feet high.

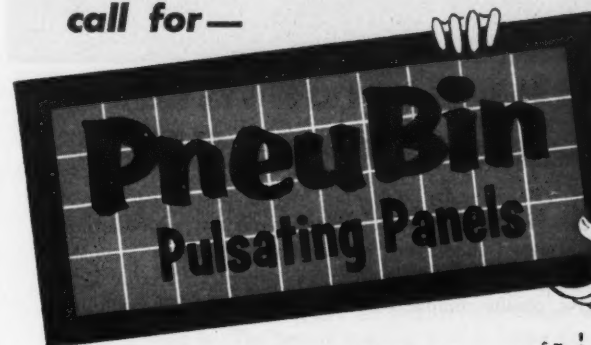
(TW-360 bottom dump wagon is a development of Allis-Chalmers Mfg. Co., Dept. CP, Milwaukee, Wisc. Check CP 3144, opposite last page.)

What's Your Bin S.Q.?

* Safety Quotient

How safe are your bins? Do you require an employee to endanger his safety and possibly his life by attempting to prod hung-up material from inside the bin. If so, you are creating a definite safety hazard.

**Modern plant methods
call for—**



**for safe, efficient,
mechanical material flow!**

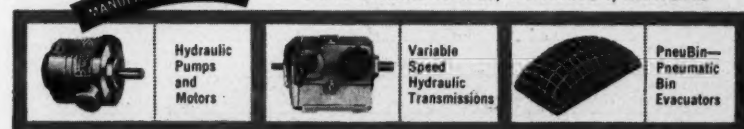
PneuBin panels . . . mounted on the inside walls of your present bins and operating from your regular plant air supply . . . inflate and deflate in regulated cycles positively displacing the bin contents to free flow.

PneuBin decreases plant operating costs by reducing maintenance, insures constant material flow to production lines, eliminates accidents to personnel and increases other personnel's efficiency through its quiet operation.

Send for "Flow Stoppage Report" and FREE literature. PneuBin engineers will gladly make recommendations with no obligation on your part.

**GEROTOR
MAY CORPORATION**

1527 MARYLAND AVENUE, BALTIMORE 3, MARYLAND



When inquiring check CP 3145 opposite last page



Use this pilot filter In your plant-FREE

Filter size, flow rate, capacity and other factors can be determined *before* you buy new filters. Use this Niagara vertical pilot filter — or a horizontal type — under your actual plant conditions. It is the practical way to study a filtration problem. Niagara Pressure Leaf pilot filters give results comparable to those of big production-line Niagaras.

FREE There is absolutely no charge for the pilot filter. Most users easily complete their tests in a week; however, the filter is yours for 30 days, less a few days shipping time. If you wish to keep the pilot longer, there's a nominal rental fee.

A Niagara engineer is also available to assist you in your testing program. But make your application now. The number of pilot filters available is limited.

MAIL COUPON TODAY

Niagara FILTERS

A DIVISION OF

American Machine and Metals, Inc.

DEPT. CP-156, EAST MOLINE, ILLINOIS

In Europe: Niagara Filters, Europe, Post Box 1109, Amsterdam-C, Holland

Please send me details on 30-day free trial of a Niagara Pilot filter.

Product to be filtered in _____

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

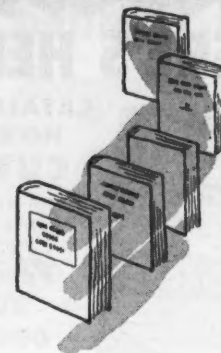
CITY _____

ZONE _____

STATE _____

When inquiring check CP 3146 opposite last page

Recent Books



Problems and Control of Air Pollution

Reviewed by W. L. FAITH
Vice President and Chief Engineer
Air Pollution Foundation

This book, edited by Frederick S. Mallette, Executive Secretary, Committee on Air Pollution Control, The American Society of Mechanical Engineers, is a collection of 25 papers. These are essentially the Proceedings of the First International Congress on Air Pollution held in New York City, March 1-2, 1955, under the sponsorship of the Committee on Air-Pollution Controls of The American Society of Mechanical Engineers.

Papers are divided into four general areas: gaps in the available knowledge on air pollution, current developments in air pollution, sulfur dioxide — treatment and recovery, and experience in air pollution abroad.

The six papers on gaps in available knowledge discuss the biological, physiological, meteorological, engineering, and administrative problems of air pollution.

The section on current developments consists of four papers. The first contains excellent data on the nature of effluents from diesel engines, and evaluation of proposed control methods. The second is a discussion of important factors in the design of more efficient rubbish incinerators. These are followed by a discussion of the nature and measurement of atmospheric air pollution, and a description of an air pollution survey at Sarnia, Ontario.

Eight papers are presented on the treatment and recovery of sulfur dioxide, and deal with the control of sulfur dioxide emissions from power plant stacks, petroleum refineries, chemical plants, coke ovens, and steel mills. Those faced with sulfur dioxide

problems will find this section a source of valuable information.

The final section is a collection of five papers on air pollution experience and developments in The Netherlands, Portugal, Italy, and France. The London problem is discussed in the first paper in the book, which is the Calvin W. Rice lecture by Sir Hugh E. C. Beaver, Chairman of the Government Committee of Enquiry into the Nature, Causes, and Effects of Air Pollution.

This book is recommended highly, not only to those actively engaged in air pollution studies, but also to those unfamiliar with the technical aspects of the problem who would like to become acquainted with its magnitude and complexity. In this connection, most of the papers include an excellent bibliography. On the other hand, the peculiar aspects of the Los Angeles problem are dealt with in only one of the papers.

To obtain "Problems and Control of Air Pollution" remit \$7.50 direct to Reinhold Publishing Corp., Dept. CP, 430 Park Ave., New York, N. Y.

Titanium in Industry

Reviewed by J. K. SPRINKLE
Assistant Professor
Metallurgical Engineering Department
Virginia Polytechnic Institute

"Titanium in Industry", by Abkowitz, Burke and Hiltz, is a 224-page book that covers every aspect of the titanium industry, from production to processing and physical properties. Both titanium and its alloys are fully discussed without going too deeply into specialized details. Several methods of obtaining titanium from its ores, as well as

reviews of current technical and reference works
. . . summarized for you by authorities in the field
working with the CP staff

the physical, chemical and mechanical properties are included.

Other chapters cover alloying, heat treatment, hot and cold shaping by various methods, casting, powder metallurgy, machining, grinding and joining by welding, brazing, soldering and mechanical means. The surface properties of titanium and its alloys are discussed in relation to corrosion, frictional phenomena, coatings, surface hardening and cleaning.

The techniques of chemical analysis and metallography as applied to research or production quality control are included. There is also a chapter on the selection of the proper titanium alloy and applications of these alloys in the aircraft, marine, ordnance, transportation, chemical industries.

To obtain "Titanium in Industry" remit \$5 direct to D. Van Nostrand Co., Inc., Dept. CP, 250 Fourth Ave., New York 10, N. Y. Check CP 3147 opposite last page.

Liquid-Liquid Extraction

Reviewed by D. S. DAVIS
 Professor of Chemical Engineering
 Virginia Polytechnic Institute

In 206 pages, L. Alders, research chemist with the Sheel Laboratories in Amsterdam, presents systematic and detailed theory of liquid-liquid extraction. Three major objectives are successfully accomplished: to describe measuring techniques necessary in obtaining data for extraction calculations, to illustrate these calculations and their underlying theory, and to describe laboratory-scale operations that throw light on results attainable in commercial processes that employ methods of extraction.

The six chapters devoted to phase equilibria, ternary diagrams, cross-current extrac-

tion, countercurrent extraction, two-solvent extraction, and reflux in extraction processes contain charts, data, methods, and equations that are not readily available elsewhere — features that greatly enhance the value of the book. Throughout, the definitions are concise, the information is logically organized, the illustrations are helpful, and the conventions and notations are those already familiar to American chemists and chemical engineers. In welcome contrast to some of the books on the subject, this one offers mathematical proofs of the relationships between quantities of phases and line segments on the phase diagram and of the linearity of points that represent the compositions of two phases and of their mixture.

Printed in The Netherlands, this volume is an excellent example of the best in book manufacture and maintains the standards set by Elsevier in every respect. When used with the instructor's own problem, it should constitute a very satisfactory textbook.

To obtain "Liquid-Liquid Extraction" remit \$5.50 direct to the Elsevier Press, Dept. CP, 402 Lovett Blvd., Houston, Texas. Check CP 3148, opposite last page.

Hawley's Technical Speller

(Staff Review)

Gessner G. and Alice W. Hawley have compiled a 146-page digest-size book that lists over 8000 words frequently misspelled in technical writing. Words are divided into syllables, and capitalizations and proper hyphenation are indicated. A three-page list gives recommended uses of many misapplied propositions.

To obtain "Hawley's Technical Speller", remit \$2.95 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y.

NEW
Centrifugal



BOTTOM DISCHARGE *Plus* CENTER-SLUNG® SUSPENSION . . .

unloads fast This new Tolhurst Batch-Master Centrifugal discharges solids through the bottom in seconds . . . saves unloading time . . . speeds up production cycles. In fact, it's the fastest unloading centrifugal there is. The bottom opening is 25% larger than on any other machine.

handles unbalanced loads Batch-Master is constructed with Tolhurst's exclusive "Center-Slung" design. The points of suspension on the case are in a plane which passes through the center of gravity of the rotating basket and load. This reduces the overturning effects of unbalanced loads and allows the rotating mass to find its own center of gyration. Thus "Center-Slung" centrifugals handle 3 to 4 times greater out-of-balance loads than ordinary machines. So Batch-Master runs smoothly — with vibration largely eliminated, bearing stress relieved.

Sizes are 40" and 48" . . . in choice of corrosion-resistant materials . . . perforate or imperforate baskets. Send for full data.

MAIL COUPON TODAY

Tolhurst CENTRIFUGALS
 A DIVISION OF
American Machine and Metals, Inc.
Specialists in liquid-solids separation.
 DEPT. CPT-156, EAST MOLINE, ILLINOIS

☐ Send data on new Batch-Master.
☐ Have a representative call.

NAME AND TITLE _____
 COMPANY _____
 ADDRESS _____
 CITY _____ ZONE _____ STATE _____

When inquiring check CP 3149 opposite last page

NOW- Available for HIGH PRESSURE SERVICE



Service in working pressures to 300 p.s.i.g. is offered by the new VAREC Figure 2500C Automatic Tank Gauge. It's a high pressure model of the successful VAREC Figure 2500 Series, equipped with the Neg'ator motor, which eliminates use of counterweight and simplifies installation. This series has been tested by 3 years of service in the Petroleum and Chemical fields, after 2 years of experimental and development work.

An important part of this new model is the magnetic drive, which requires no packing gland or mechanical seal on rotating shaft. The use of stainless steel ball bearing construction throughout provides a combination that reduces friction to a minimum.

Liquid level indication on a mechanical counter and dial for convenient, easy reading. Components are enclosed in a separate compartment to keep tank vapors from fogging dial. Operation checker is standard equipment.

All the field-tested, desirable features of the VAREC Figure 2500 Series have been incorporated in this new gauge for high pressure service — the Figure 2500C.



VAPOR RECOVERY SYSTEMS COMPANY

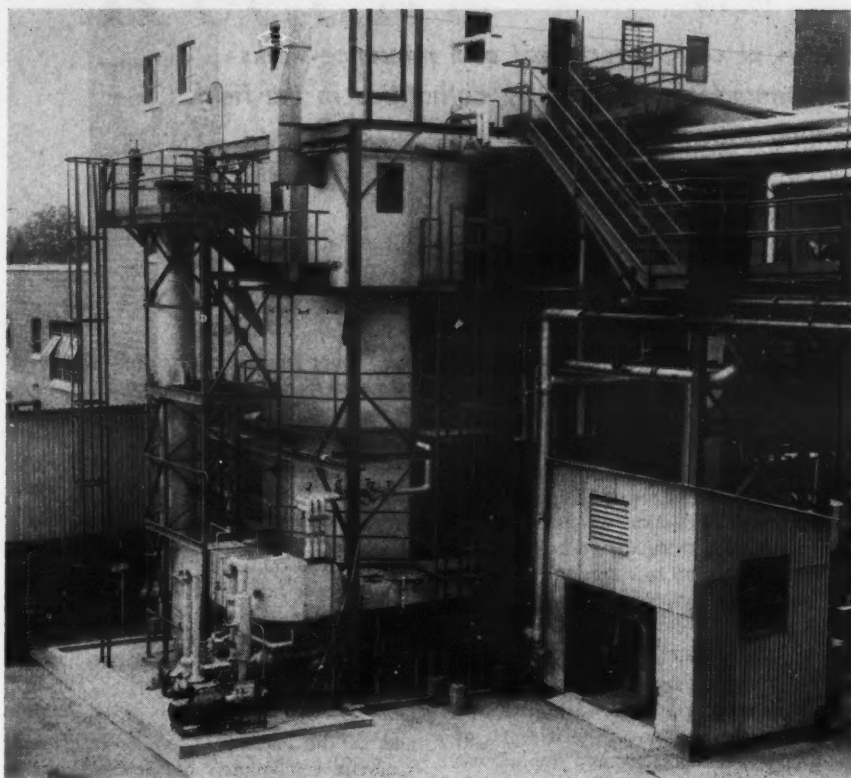
2820 North Alameda Street
Compton 1, California

Cable address: VAREC COMPTON Calif. (U.S.A.) All Codes

961-9

When inquiring check CP 3150 opposite last page

safety



Two dryers at Lederle Labs can be operated individually or as a unit

Lederle Laboratories Division, American Cyanamid Company obtains maximum removal of butanol solvent from Aureomycin byproduct mycelia cake and . . .

minimizes explosive hazard in drying operation

**Continuously operating unit
utilizes inert gas atmosphere and
interlocking safety controls**

Problem: Due to proximity to direct heat, when mycelia cake is oven-dried at Lederle Laboratories Div., American Cyanamid Company, solvent vapors constituted an explosive hazard. In addition, batch drying, with several manual operations necessary, was time consuming and inefficient.

Valuable, flammable solvent was lost.

Extracted mycelia cake contains approximately 60% volatile matter, chiefly solvent and a controllable quantity of Aureomycin together with vitamin B-12. Product is a valuable feed supplement for livestock as a growth-promoting factor.

Solution: In 1951 Lederle installed two continuously-operating dryers, which can be operated together as a unit or individually, modified to work in closed circuit with an inert gas. Cake containing volatile matter enters top of dryer

and is dried by contact with heated gas. Solids work down dryer on a series of trays and leave at bottom with a negligible solvent content. Dry cake is transferred to feeds section by means of screw conveyors for further processing, blending and sacking.

Gas, after removing volatile matter from mycelia cake, is passed through a condenser where volatile materials are condensed and separated. It is reheated and recirculated to base of dryer. Installation is provided with continuous input of about 200 cfm of inert gas with a corresponding bleed which is vented through an activated carbon absorber for solvent recovery.

Inert gas is supplied by generators operating on natural gas to produce an inert mixture, stripped of water vapor, consisting almost entirely of nitrogen and carbon dioxide. Oxygen content is held to less than 5%.

Installation is designed to operate automatically. To prevent leakage of solvent vapors dryers are operated under a slight negative pressure of less than 0.01 inch of water. Hays oxygen recorders on each dryer are checked by a third recorder to prevent oxygen level from exceeding 5%. Mine Safety Appliances explosive gas detector gives warning when solvent concentration in dried cake is above a determined figure. Automatic shut-down is provided by a temperature instrument on condenser discharge. A pressure switch on output of inert gas generators shuts process down automatically if gas supply fails.

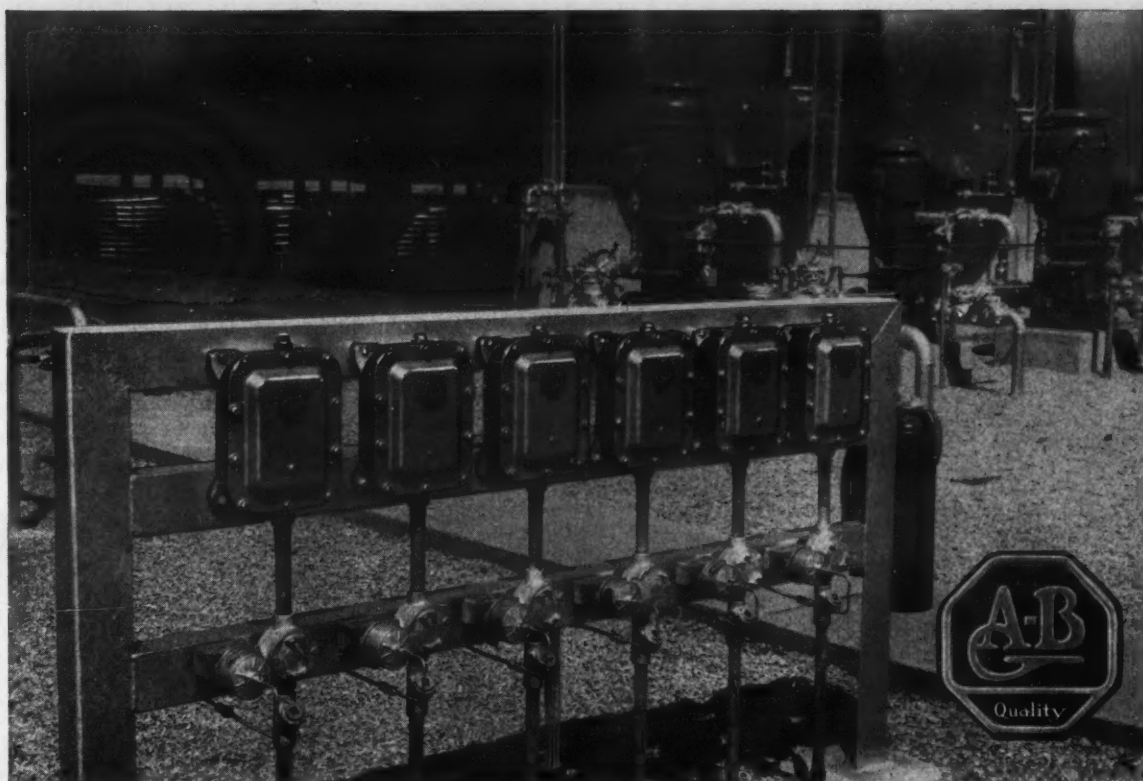
Results: Explosive hazard, eminent in oven drying of solvent-containing cake, has been reduced to a minimum. All solvent is recovered for reuse and high quality of product is maintained. Only a minimum of maintenance has been required. Unit handles many times the amount of mycelia cake per day as was possible with oven drying. Manpower necessary for drying operation was dramatically reduced.

(Turbo-dryers installed at Lederle are a product of Wyssmont Co., Inc. Dept. CP, 42-05 27th St., Long Island City 1, N.Y. Check CP 3151, opp. last page.)

Shows magnetic traps for pipelines

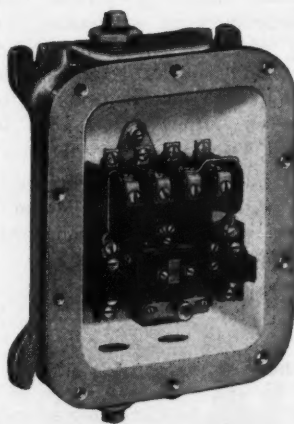
Four-page bulletin, printed in two colors, illustrates several applications of magnetic pipeline traps. Two models and standard dimensions are pictured and tabulated.

Bulletin B-605 is issued by Eriez Mfg. Co., Dept. CP, 1945 Grove Drive, Erie, Pa. When inquiring specify CP 3152 on form opposite last page.



A row of six Allen-Bradley Bulletin 709 automatic explosion-proof starters on loading pumps of an L.P.G. processing plant

FOR SAFE AUTOMATIC MOTOR OPERATION in Hazardous Locations *Specify* Allen-Bradley Explosion-proof Solenoid Starters



Bulletin 709 Solenoid Starter
Allen-Bradley Size 1 solenoid starter in a NEMA Type 7 enclosure for operation in hazardous gas locations. The cover and base have wide machined flanges.

It takes a lot of maintenance time to open and replace bolted covers of explosion-proof starters. That's why it is important to specify Allen-Bradley solenoid starters . . . which are good for millions of operations without contact maintenance. The thermal overload relays can be reset without opening the enclosure.

Reduce your plant maintenance by using Bulletin 709 solenoid starters. You can install them . . . and forget them. Write for the Allen-Bradley Handy Catalog . . . a valuable guide for selecting motor controls and enclosures for every type of industrial service.

Allen-Bradley Co.
104 W. Greenfield Ave., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.



Double Break, Silver Alloy Contacts
Arc hood lifted to show double break, silver alloy contacts on solenoid plunger and in arc hood. The basic solenoid design of all Bulletin 709 ratings is identical.

When inquiring check CP 3153 opposite last page

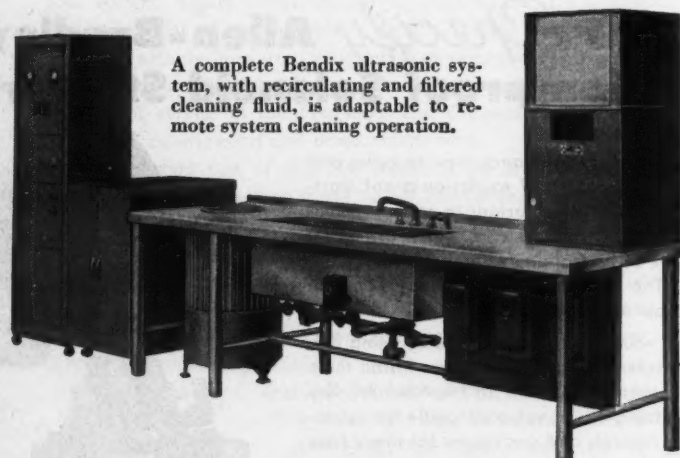
Bendix ULTRASONIC DECONTAMINATION

**An effective answer
to a growing problem**

The ever-increasing problem of removing surface radioactive contamination from hand tools, gauges, instruments and parts has a rapid, efficient answer—Bendix ultrasonic cleaning equipment.

For example, Bendix ultrasonic cleaning units can even remove radioactive contaminants of various types which have been deposited under high temperatures over an extended period of time. Using only water-detergent solutions, our ultrasonic cleaners remove 99.5% to 99.9% of this contamination in two minutes . . . far surpassing results obtainable by any other known method.

Bendix ultrasonic systems are now widely used on industrial cleaning applications, including radioactive decontamination of hand tools. Investigate their possibilities. For descriptive literature, write BENDIX AVIATION CORPORATION, 2710 HICKORY GROVE ROAD, DAVENPORT, IOWA.



A complete Bendix ultrasonic system, with recirculating and filtered cleaning fluid, is adaptable to remote system cleaning operation.

West Coast Office: 117 E. Providencia Ave., Burbank, Calif.
Export Sales and Service: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.



When inquiring check CP 3154 opposite last page

SAFETY

**Spots off-beat operation
or equipment troubles
through noise . . .**

trouble-shooter's tool consists of probe mike, battery-powered amplifier, and earphones

Uses: Instrument, by amplification of sounds, detects faults and bearing failures in motors and machinery, leaks in pipe lines and surface flaws in various materials.

Features: Unit detects trouble through sounds, which because of frequency, intensity or other noises, may not be heard by the unaided ear. Detector is not affected by surrounding sounds.



Operator locates source of trouble by probing with contact microphone

Description: Using detector, operator can locate exact source of trouble without need to dismantle piece of equipment. Unit consists of highly sensitive contact-microphone encased in probe handle, three stage amplifier and headphones. Visual measurement can be obtained by adding an output meter. Unit is powered by standard batteries.

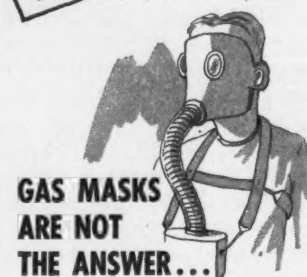
(Auditec is product of John Ould, (USA) Ltd., Dept. CP, 519 S. 5th Ave., Mount Vernon, N. Y. . . or for more information check CP 3155 on form opposite last page.)

Tells how asbestos aids safety

Twelve-page booklet shows asbestos suits, helmets, aprons, leggings, gloves, and gauntlets. It explains that these are specifically designed to resist heat, but will resist oil, water, abrasion.

"Asbestos Safety Clothing" is issued by Johns-Manville, Dept. CP, 22 E. 40th St., New York 16, N. Y. When inquiring specify CP 3156 on form opposite last page.

MAIL COUPON BELOW
**The BETTER the ODOR
the BIGGER the SALES!**



...if the citizens of your community are aroused, inconvenienced and annoyed by the presence of offensive odors emanating from your plant! No, you've got to treat the trouble "in your own backyard" before a nuisance condition has been created of which the townsfolk can justly complain. When such problem stems from fat rendering, sewage accumulation, or the decomposition of any protein materials, the use of PUTROL* can be highly recommended. This new, powerful and very effective industrial odorant has many odor control applications and it might well prove a real boon to your company and your community if given a proper trial. Write us, please, for sample, price and particulars.

*Reg. U.S. Pat. Off.

PLEASE FILL IN AND MAIL

FRITZSCHE BROTHERS, Inc.
76 NINTH AVE., NEW YORK 11, N. Y.
We are interested in ☐ PERFUMES
☐ ODOR NEUTRALIZERS for use in the manufacture of products checked below. What do you recommend?
☐ ADHESIVES ☐ FINISHES ☐ INK
☐ LEATHER ☐ PAINT ☐ PLASTICS
☐ PETROLEUM PRODUCTS
☐ POLISHES ☐ RUBBER ☐ SOLVENTS
☐ SPRAYS ☐ TEXTILE CHEMICALS
☐ OTHERS:

(Note: Please send accompanying letter giving details of your particular problem.)

COMPANY: _____

ADDRESS: _____

CITY: _____ STATE: _____

ATTENTION: _____

TITLE: _____

FRITZSCHE Brothers, Inc.
ESTABLISHED 1871
PORT AUTHORITY BUILDING
76 NINTH AVENUE, NEW YORK 11, N. Y.

When inquiring check CP 3157
opposite last page

CHEMICAL PROCESSING

SAFETY

Protects acid-filled bottles from breakage . . .

carrier, of welded polyethylene, holds standard five-pint bottles

Uses: Protects acid-filled bottles or carboys from breakage.

Features: Carrier is of welded $\frac{1}{4}$ " polyethylene with centering ring which allows bottle to be packed in ice or other coolant. Top holds bottle in centered position even while pouring.



Carrier protects bottle from breakage or shock

Description: Unit holds standard five-pint acid bottles or can be ordered to individual specs. Standard dimensions overall are 8- $\frac{1}{2}$ x 18- $\frac{1}{16}$ ".

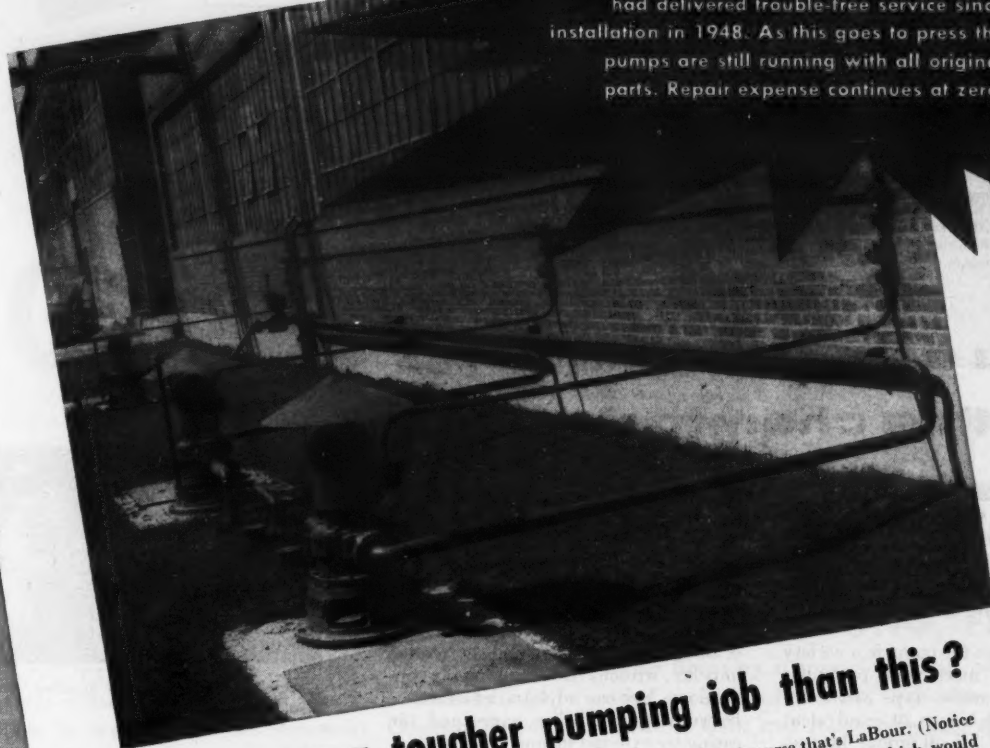
(Carrier is manufactured by American Agile Corp., Dept. CP, Box 168, Bedford, Ohio . . . or for more information check CP 3158, opp. last page.)

Describes glasses to cut glare

Single page describes night-driving glasses which reduce glare and eye fatigue. "Night Drivers" is issued by Ramco Manufacturing Co., Dept. CP, 347 Lincoln Ave., Cranford, N. J. When inquiring specify CP 3159 on form opposite last page.

This ad appeared in 1951

... after the pumps had delivered trouble-free service since installation in 1948. As this goes to press the pumps are still running with all original parts. Repair expense continues at zero.



Have you a tougher pumping job than this?

These pumps — regular LaBour Type BGM with the housings sealed and equipped with explosion-proof motors — are handling alcohol-acetone mixtures under a 13 foot suction lift and against an 85 foot head. The presence of this solvent would make packing lubrication extremely difficult — but all LaBour Type G pumps are packingless, so there's no problem at all.

The volatility of the alcohol-acetone solution demands a truly self-priming pump that cannot

vapor bind — and of course that's LaBour. (Notice the sunshades to keep off hot rays which would induce greater vaporization.) The housings are sealed and vented through pipes and air-release valves on account of the fire hazard.

Here is another instance that proves LaBour pumps are the answer to the tough pumping jobs. That's why they can be counted on for dependable service on any job.

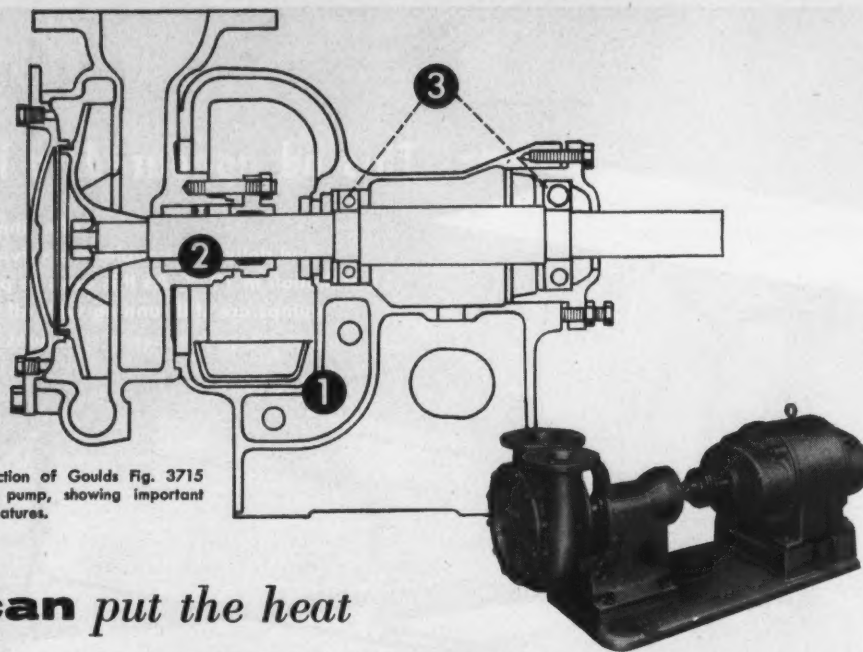
ORIGINAL MANUFACTURERS OF THE SELF-PRIMING CENTRIFUGAL PUMP

LABOUR

THE LABOUR COMPANY, INC. * Elkhart, Indiana, U.S.A.



When inquiring check CP 3160 opposite last page



Cross section of Goulds Fig. 3715 chemical pump, showing important design features.

You can put the heat on this chemical pump

Handling hot, corrosive, or abrasive liquids is what the Goulds Fig. 3715 pump is built for.

You can run this pump at 350° F. by cooling the support head (1) and quenching the gland, through fittings that are built in.

And you can get the pump in a variety of materials to meet your particular liquid-handling needs—type 316 stainless steel, Gould-A-Loy 20 (equivalent to ACI CN 7M CU), all bronze, bronze-fitted, all iron, or iron or bronze with stainless trim. These materials regularly stocked—other material can be furnished on order.

Wide range of sizes

There's a size, too, to meet most requirements—nine sizes in all, providing capacities up to 720 GPM, and heads to 200 ft.

Whatever size and construction material you need, you can be sure that your Goulds Fig. 3715 pump will operate with high efficiency and low maintenance cost.

Mechanical seals available

The stuffing box (2) is on the suction

side of the impeller, subject to suction pressure only. Or we can equip your pump with either a single or double mechanical seal. Completely sealed bearings (3) keep out dirt and moisture, and are grease lubricated.

You can inspect and clean the interior of the pump, or remove and replace the impeller, without disturbing piping connections. You can adjust axial clearance between the impeller vanes and the casing by external means.

Interchangeability of parts

And you can keep your parts inventory low, for many of the parts are standardized for interchangeability between sizes. For example, you need only two different shafts for all 9 sizes of Fig. 3715 pumps.

We'd like to send you additional details about these chemical pumps. Just drop us a line, asking for Bulletin 725.4. It gives performance curves, sizes and specifications. Or, if you have a pumping problem of any kind one of our representatives will be glad to consult with you about it.



Goulds stainless steel pump handling corn meal mush in a food plant.



This Goulds chemical pump is handling hot fatty acids in an oil processing plant.



These three Goulds chemical pumps circulate hot size in a textile plant.



ATLANTA • BOSTON • CHICAGO • HOUSTON • NEW YORK • PHILADELPHIA • PITTSBURGH • TULSA



When inquiring check CP 3161 opposite last page

SAFETY

Ultraviolet instrument . . .

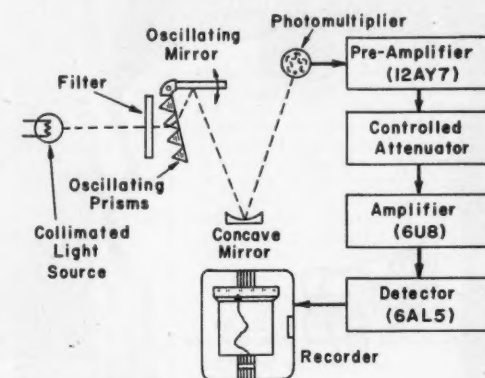
Eyes ozone in smog studies

Can detect and record one part in 100,000,000 — operation is automatic

Uses: Automatically detects and records concentrations of ozone in the atmosphere.

Features: Ultraviolet absorption is operating principle which allows this device to detect and record concentrations as low as one part in 100,000,000.

Description: Ozone radiometer employs an ultraviolet projector and a receiving instrument which are separated by 100 feet or more of the



Schematic shows how ozone recorder operates

atmosphere under test. Projector produces a collimated beam of ultraviolet radiation. Receiver compares two portions of the ultraviolet spectrum — one in which ozone absorbs energy and another where it does not. These bands are located close enough to each other so that intensity variations caused by source will cancel out.

Absorption in the ozone band is due to ozone and any other absorbing material in the atmosphere. Absorption in the nearby band where ozone does not absorb cancels out other impurities or constituents of atmosphere.

Ultraviolet light, produced at the projector, is collimated. It travels through intervening atmosphere and enters receiver through an ultraviolet-transmitting, daylight-absorbing window. Here, beam is dispersed by an array of quartz prisms and is reflected by an oscillating mirror.

Oscillation of mirror produces the wave length shift which brings instrument's operation alternately into ozone-absorbing and ozone-none-absorbing regions of spectrum. Reflected beam is bounced from a concave mirror and received by a photo-

SAFETY

multiplier tube. Electrical impulse so produced is amplified. After amplification, signal passes through a controlled attenuator, through another stage of amplification, through a detector, and finally to a stripchart recorder.

Purpose of the attenuator is to keep recording level (at chart) high on the scale. Thus, regardless of actual ozone level, record is in a readable portion of the range.

This attenuator is operated by a clock-driven range switch to hold record level in optimum range. Instrument also features self-calibration — it periodically monitors spectral distribution of source instead of measuring absorption in the atmosphere.

(Ozone radiometer is a development sponsored by the Air Pollution Foundation, Dept. CP, 714 S. Spring St., Los Angeles 14, Calif. Instrument itself was built by Borman Engineering, Inc., Dept. CP, P. O. Box 646, 5356 Riverton Ave., North Hollywood, Calif. . . . or for more information check CP 3162 on form opposite last page.)

Resists alkalis, acids, salt, temperature to 175°F

Uses: Polyethylene "glassware" is safe for in-plant or field use where excessive breakage is likely to occur.

Features: Material offers resistance to most acids, including hydrofluoric, alkalis, salt solutions and a large number of organic chemicals at temperatures up to 175°F.



Graduates resist most acids, alkalis and salt solutions

Description: Non-breakable graduated cylinders are available in 25 ml to 1000 ml capacities. Beaker sizes range from 250 ml to 4000 ml capacity. Some sizes are of one-piece construction; others are molded, then welded.

(Beakers and graduates are manufactured by American Agile Corp., Dept. CP, Box 168, Cleveland 15, Ohio . . . or for more information check CP 3163 on the convenient Reader Service slip which is located opposite last page.)

*Until You See it...
Feel it... Test it!*

GOODALL

"Lite-Flex" FIRE HOSE

GREATEST ADVANCE IN FIRE HOSE CONSTRUCTION IN OVER HALF A CENTURY! AMAZINGLY LIGHT, STRONG, FLEXIBLE!

Here's the new hose that completely changes all previous conceptions of weight, strength, flexibility and bulk in fire hose for Oil Refineries, Chemical Plants and other installations where oils, chemicals, greases and other deteriorating agents are present. Less than half the weight of regular neoprene covered hose, it has a much higher burst pressure rating, and its flexibility far surpasses any other conventional fire hose. The vast difference in bulk between "Lite-Flex" and regular neoprene covered hose is illustrated above—a 100' coil of "Lite-Flex" compared to a 50' coil of standard neoprene covered.

The very thin, lightweight jacket combines high-

tensile fibres by a special weaving process that provides exceptional strength, with highest resistance to pressure, wear and rough handling. A cover of gray latex assures long-lasting protection from chemicals, oils, greases and moisture penetration.

"Lite-Flex" is fully rubber lined . . . seamless, multiple-laminated, reinforced construction, with a smooth waterway to insure unrestricted flow. Sizes 1½" and 2½", in maximum lengths of 100 feet.

★ ★ ★

Where exceptionally high abrasion and/or chemical resistance is a factor, ask about "Syn-Flex"—a new hose similar in construction to "Lite-Flex", but with a black "Synplastic"® cover.

GOODALL RUBBER COMPANY

444 Whitehead Rd., Trenton 4, N. J.

☐ Send Complete Information on ☐ "LITE-FLEX" ☐ "SYN-FLEX"

☐ Send Representative With Samples

Company _____

Address _____

City _____ Zone _____ State _____

Date _____

Standard of Quality—Since 1870



HOSE • BELTING • FOOTWEAR • CLOTHING
AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL Rubber Company

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
Branches and Distributors Throughout the United States and in Canada

"If it's GOODALL . . . it MUST be Good!"

When inquiring check CP 3164 opposite last page



Give your product a SAFE SENDOFF Use **CHIKSAN** LOADING ARMS

Consolidated Chemical Industries is safety conscious! They use Chiksan loading arms for tank car loading of sulphuric acid.

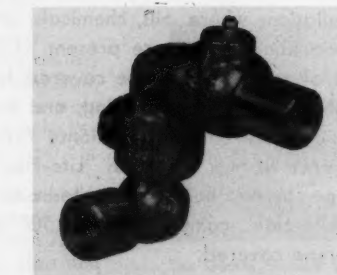
To assure complete safety in your loading operations, CHIKSAN manufactures loading arms and ball bearing swivel joints from the same materials used in the piping systems. Steel, malleable iron, nickel-bronze, stainless steel and special alloys are used... meeting most chemical requirements. CHIKSAN ball-bearing swivel joints speed the loading and unloading of both liquids and gases... safely. Send for your copy of our free catalog which shows complete CHIKSAN lines and standard loading arm designs.

WRITE DEPT. 131 FOR CATALOG

A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION



CHIKSAN COMPANY, Brea, California • Chicago 3, Illinois • Newark 2, New Jersey • Well Equipment Mfg. Corp., (Division) Houston 7, Texas • Chiksan Export Co., Brea, California; Newark 2, New Jersey • Chiksan of Canada, Ltd., Edmonton, Alta.



Chiksan Swivel Joints rotate 360° in 1, 2 and 3 planes, handling air, hydraulics, fuels, oils, water and other fluids.

CHIKSAN

When inquiring-check CP 3165 opposite last page

SAFETY

Sniffs for combustible gases, runs on flashlight cells...

on-off switch attached to aspirator bulb minimizes battery drain

Uses: For detecting and measuring combustible gases and vapors in atmosphere.

Features: Battery life is increased by on-off switch actuated by aspirator bulb. Batterys are not drained expect when detector is in actual operation.



Detector, worn on neck strap, weighs slightly over four pounds

Description: Reduced air-flow resistance permits use of soft aspirator bulb, minimizing operator fatigue. Detector is worn waist high, suspended from neck strap. Unit is enclosed in corrosion-resistant fiberglass case. Hermetically-sealed indicating meter is unaffected by moisture, dust or magnetic fields. Unit, complete with eight flashlight cells, weighs slightly over four lb.

(Model G detector is manufactured by Johnson-Williams, Inc., Dept. CP, 2725 Park Blvd., Palo Alto, Calif. . . . or for more information check CP 3166 on form opposite last page.)

Standard safety code for sprinklers

Revised fire safety code for installation of automatic sprinkler systems has been issued for 1955. It includes information and specifications for use of spray sprinklers. Water supplies and fire department connections, specifications on piping, valves, pipe fittings, hangers, temperature ratings, and other vital factors are considered. Printed in pamphlet form, code is 162 pages long.

To obtain NFPA Standard 13 remit \$1 direct to National Fire Protection Association, Dept. CP, 60 Battery March St., Boston 10, Mass.

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Co.-Toronto

THE PROT
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Address
City

When

JAN

Flammables

STORE SAFE and POUR SAFE

with this Approved Double-Duty
Safety Container!

PROTECTOSEAL STOR'POR Dispenser



combines the functions of a Safety Can with those of a Supply Can to perform both services with one piece of equipment—eliminates cost of an extra can—does away with necessity of using a funnel with its lack of control and possibility of dangerous spillage.

The Protectoseal Stor-Por Dispenser is Underwriters Laboratories and Factory Mutual Laboratories approved. Both fill opening and pouring spout have double perforated metal fire baffles to prevent ignition of contents. Easy-working valve at base of flexible spout is operated by carrying hand and gives positive control while pouring. Available with 1/4" and 1/2" flexible hoses in 1- and 2-gallon sizes, and 3/4", 3/8" and 1" flexible hoses or rigid spouts in 3- and 5-gallon sizes.



Protectoseal is the one COMPLETE source of approved equipment for all flammable operations—Production—Storage—Dispensing.

All Protectoseal Fire Preventive Equipment is designed by specialized engineers for time-saving and convenient use, and in most cases actually speeds production.

Send for NEW Flammables Equipment Guide Chart. Illustrates and describes 30 approved Fire Protective Safety Devices and their uses.

Fill in coupon and attach to company letterhead. West Coast Warehouse: Los Angeles, Calif. In Canada: Safety Supply Co.—Toronto.



THE PROTECTOSEAL COMPANY
1932 S. Western Ave., Chicago 8, Ill.

Without cost or obligation, send "A Guide to Selection and Use of Protectoseal Equipment for the Safe Storage, Handling and Use of Flammables."

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

When inquiring check CP 3167
opposite last page

SAFETY

Provides radiation monitoring
from 0.05 to 50 roentgens . . .

functions for up to 180 hours on hearing-aid batteries — requires no maintenance

Uses: Unit protects workers in contaminated areas from dangerous radiation level during nuclear fission tests or other exposures to radiation.

Features: Compact shock- and moisture-proof unit is simple to operate. Other than battery changes, no maintenance or adjustments are required.

Description: Operation of balanced ionization chamber is based on balancing between a negative ion current, generated by radiation, and a positive ion current developed by an alpha transmitter



Other than on-off switch, unit has no controls, requires no operation or maintenance

within the unit. Balancing makes possible, by means of a radium-treated needle and a calibrated scale, instant determination of the length of time an individual can safely remain within a radioactive area.

Unit has a calibrated range of from 0.05 to 50 roentgens an hour. Approximately 200 roentgens will fatally injure an exposed person. Therefore, at a rate of 50 roentgens per hour, worker could remain in danger area from 1 to 2 hours without serious injury. Four hour stay would prove fatal. Unit affords worker a means of determining just how long he can remain in radioactive area.

(BIC-2 balanced ionization chamber is product of Librascope, Inc., Dept. CP, 808 Western Ave., Glendale, Calif. Check CP 3168 opposite last page.)

the NEW



SOLFRUNT®

(SOLID FRONT CONSTRUCTION)



the gauge with

BUILT-IN SAFETY!

There's safety with the new USG Solfrunt Gauge . . . behind the face is a solid metal wall! In the event of a Bourdon tube rupture, pressure is released through the large rubber blowout back. The case is of aluminum.

Like USG's Supergauge . . . with proper application . . . the Solfrunt is built to last a lifetime.

ARC-LOC MOVEMENT—Rugged beyond compare . . . broad generated gear faces, deep stainless steel bushings. Calibration adjustments from rear by merely removing blowout back.

SEGMENT—Stainless steel, with nylon-faced gear section. Nylon-to-metal bond stabilizes the nylon against expansion and contraction . . . maintains accurate pitch diameter . . . assures proper mesh with stainless steel pinion under severe temperature and moisture conditions.

LEGEND ON DIAL—gives complete description of socket, Bourdon tube, and movement material for ready identification.

MICROMETER ADJUSTABLE SELF-LOCKING POINTER—permits accurate repositioning of pointer.

Solfrunt Gauges available in 4 1/2", 6" and 8 1/2" sizes. For complete information on case styles, materials of construction and connections, write for Publication 1819.

USG

UNITED STATES GAUGE

Gauge Headquarters

FOR OVER 50 YEARS

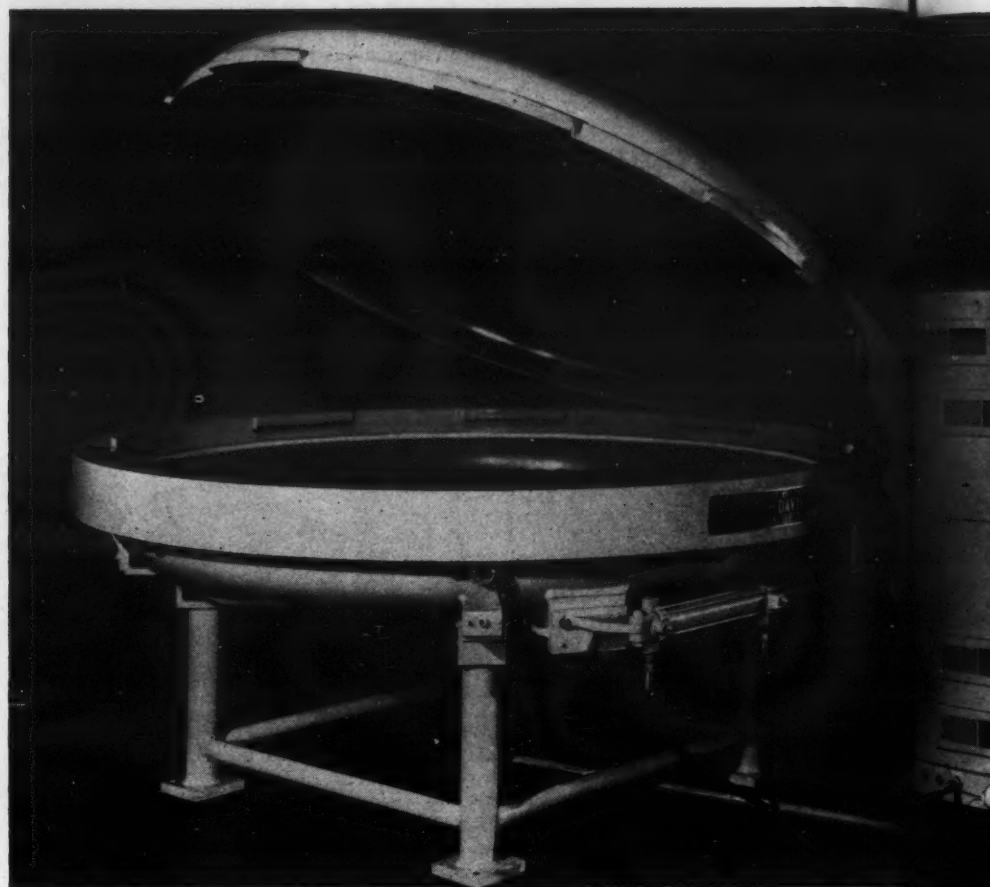
United States Gauge, Division of American Machine & Metals, Inc., 103 Clymer Avenue, Sellersville, Pa.

When inquiring check CP 3169 opposite last page

Just set it, start it, forget it — and that's
all that is needed to operate this . . .

"pushbutton" autoclave

**Heats, cools, vents, opens,
and closes automatically**



Uses: Laminating, curing, vulcanizing, or other processing of chemical, plastic, rubber, glass, or cement products.

Features: Autoclave operation is fully automatic. Control panel is "brain" of unit. Pushbutton operation permits one man and helper to operate up to eight autoclaves. Opening and closing is operated by hydraulic mechanism.

Description: Units have 84" inside diameter and 36" inside depth. Autoclave and control cabinet occupy total floor space of 9'5" x 11'9". Overhead clearance required is 11'9". Unit weighs 10,240 lb and operates on 440 or 220-volt, 3-phase, 60-cycle power. Maximum working pressure of unit is 100 psi (air).

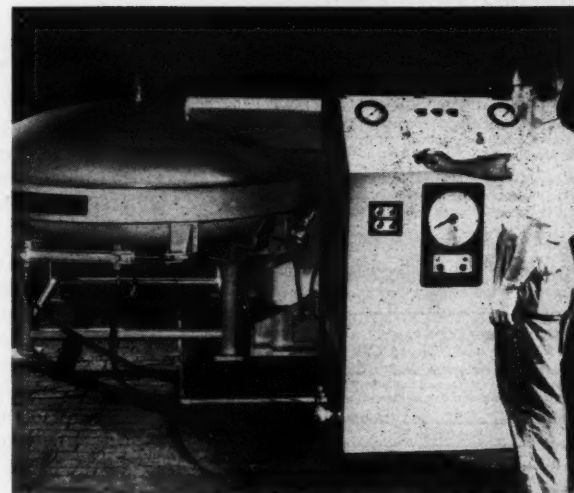
Autoclave has heat, air, water, and steam controls all operating automatically. Unit maintains constant pre-set temperature during all of its cycles, and keeps written record of each complete cycle. Operator simply sets controls to desired cycle,

pushes start-up button, and is free to perform other duties. When cycle is completed, all signal lights go out, and operator pushes unload button. This automatically bleeds air, unlocks and lifts lid, and resets unit for start of new cycle. Machine will not open until air pressure is down to zero.

Silicone rubber gasket gives unit positive seal and assures long gasket life. In case of power failure, manual controls are provided to permit removal of material being processed. At present, each autoclave requires separate control panel, but manufacturer believes it is possible to design a larger panel capable of handling up to five units.

Autoclave's original design was worked out in co-operation with North American Aviation Company for processing wing and fuselage aircraft parts by the "honey comb" process.

(Automatically-controlled autoclaves are product of Philips & Davies, Inc., Dept. CP, Kenton, Ohio . . . or check CP 3170 on form opposite last page.)



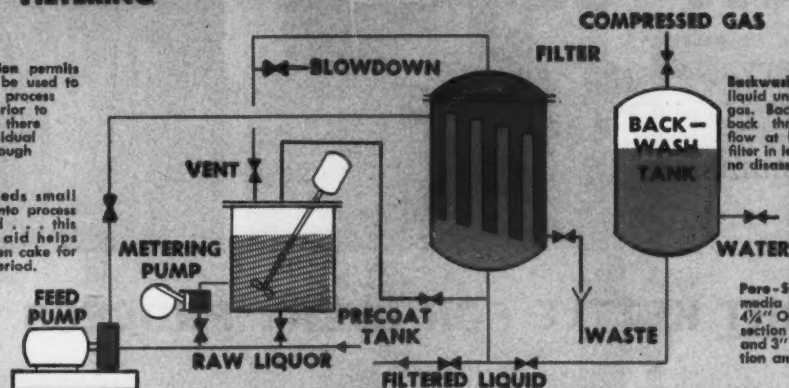
Cycle is started by simply pushing a button

FILTRATION: IMPROVED DESIGN GIVES HIGH PRODUCTION AT LOW COST FOR EXISTING PROCESS

FILTERING

Blowdown Connection permits compressed gas to be used to force all valuable process liquid from filter prior to backwashing. Note: there is no waste since residual liquid is forced through filter cake.

Metering Pump feeds small quantity of slurry into process liquid to be filtered . . . this addition of filter aid helps maintain a free, open cake for a longer filtration period.

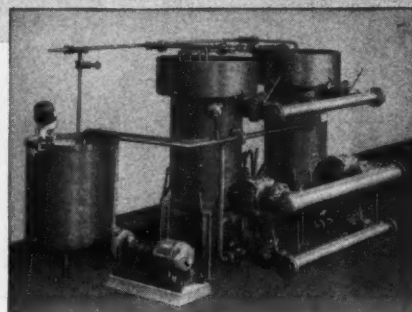


Filter Aid Tank supplies slurry for both precoat and continuous filter aid feed. Agitator keeps mixture in suspension.

Filter is made of corrosion resistant alloys to meet process requirements. Note: Complete drainage from shell of filter cake after backwashing is obtained by sloping tube sheet.

Backwash Tank holds backwash liquid under head of compressed gas. Backwash liquid is forced back through filter in reverse flow at high velocities to clean filter in less than 1/2 minute. Note: no disassembly for cleaning.

Pore-Stone or Pore-Carbon media elements . . . rugged 4 1/2" OD tubes with 1/2" wall section . . . 40% open area and 3" bore give better filtration and easier backwashing.



Jacketed construction permits heating or cooling where accurate temperature control is required. Filter pictured also has submerged head to isolate hazardous chemicals in case of gasket leakage.

An Eastern dye and chemical corporation found sales outstripping its ability to produce one of its principal products.

Action was required!

A study of the process showed several steps of liquor clarification were being handled by old and possibly obsolete equipment. The result: a serious bottleneck was found. Excessive time and labor were needed to clean filter elements; dress the filter elements and maintain element frames.

The entire problem was presented to the R. P. Adams Co., Inc. A factory engineer and the local sales representative studied the problem.

Because of the nature of the process liquid, there was some question as to which of three solutions to the problem would prove most effective: 1. bare element

...LONGER RUNS, LESS MAINTENANCE BREAK BOTTLENECK

filtration; 2. filtration through a precoat cake of filter aid; 3. continuous filter aid feed during the process cycle.

A pilot filter capable of operating under all three conditions was shipped to the dye firm. There, under actual operating conditions, the continuous feed filtration system was found to provide the best results.

What were the results when the production filters were placed in use? Longer process runs, cleaning time reduced to 15%, no element dressing time required and virtually no maintenance time — high production at a much lower cost.

Maybe you have a process bottleneck due to old filtration equipment . . . or maybe you are designing a new process system and want the latest word in modern filters. The entire R. P. Adams organization and its field representatives will be glad to help you in any way possible.

R. P. ADAMS COMPANY, INC.
243 East Park Drive
Buffalo 17, N. Y.

J-56

Gentlemen:
We have a problem in chemical filtration. Please send us your Bulletin 431. Also, ask your local representative to call on us. ☐

Name.....Title.....

Firm.....

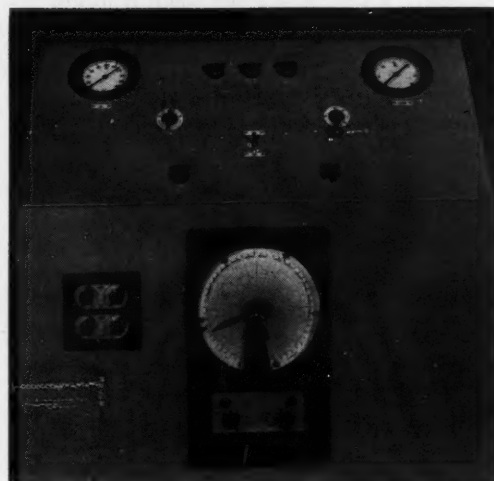
City.....State.....

R. P. ADAMS CO., INC.
243 East Park Drive Buffalo 17, N. Y.

When inquiring check CP 3171 opposite last page

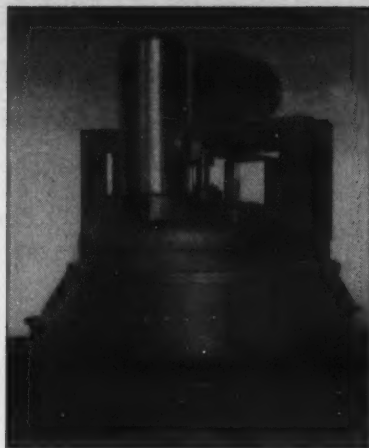


Hydraulic operation raises, lowers, and locks auto-clave lid as required by pre-set cycle

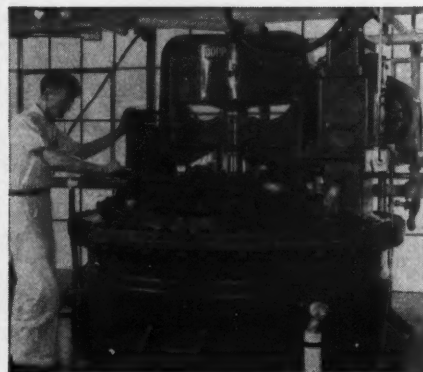
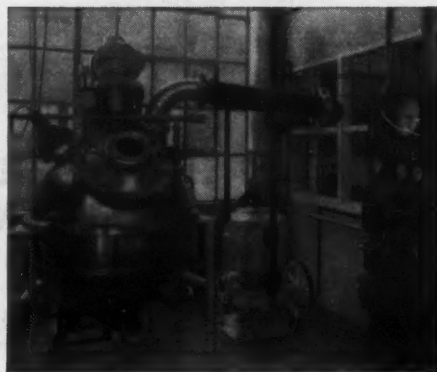
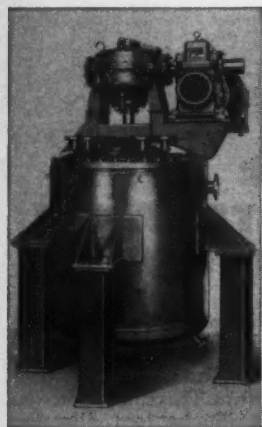


Push-button control panel operates unit, keeps written record of each cycle

Chemicals, resins,
grease, foods,
pharmaceuticals,
cosmetics,
confectionery,
dental and
shaving creams,
detergents



THE RIGHT KETTLE FOR EVERY PROCESS NEED...



with different
types of agitators and mixers,
heating methods, controls

There is a *right* kettle for every processing requirement. End product, capacity desired, heat source and method, agitation and drive, and other factors determine the type and size of kettle. After about 50 years of experience in process engineering, Blaw-Knox engineers are prepared to build the kettle to your design or engineer, design and construct a kettle to fit your operations.

We invite your inquiries.

A Complete Process Equipment Service

Kettles of every description constitute but one phase of Blaw-Knox Process Equipment design, engineering and fabrication service for the chemical, food, pharmaceutical, plastic and resin, petroleum, rubber and other industries:

EVAPORATION • DRYING • FLAKING
MIXING • IMPREGNATING • REACTION
VULCANIZING • SOLVENT RECOVERY
SOLVENT EXTRACTION • STERILIZING
CRYSTALLIZATION • DISTILLATION
POLYMERIZATION • GAS CLEANING
GAS ABSORPTION • VAPORIZATION
CONDENSATION • HEAT TRANSFER
LOW AND HIGH PRESSURE PROCESSING

BLAW-KNOX COMPANY

BUFLOVAK EQUIPMENT DIVISION

1645 Fillmore Avenue, Buffalo 11, N.Y.

Makers of process equipment engineered for any pressure, temperature, capacity, reaction



When inquiring check CP 3172 opposite last page

PROCESSING EQUIPMENT

Packaged ammonia converter has over 99 percent efficiency . . .

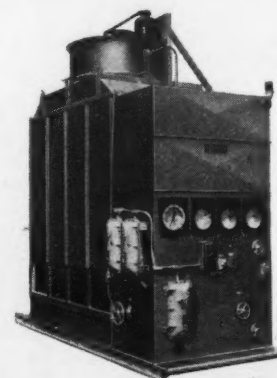
mobile unit automatically mixes anhydrous ammonia, water to any desired concentration

Uses: Producing aqueous ammonia from anhydrous ammonia and water.

Features: Packaged, mobile unit has conversion efficiency in excess of 99 percent.

Description: Converter is designed to automatically react anhydrous ammonia with water, cool the product, and deliver it to storage with minimum loss of ammonia. Valves on panel proportion the two raw materials to any desired concentration. Valves may be operated either manually or automatically.

Unit is completely enclosed and self-contained. It can operate under tank-car pressure, or from pressure furnished by an ammonia transfer unit. Initial, operating, and maintenance costs are reported to be low. Operating parts are standard and may be readily obtained from stock.



Ammonia converter is completely enclosed, self-contained

(Automatic aqua ammonia converters are product of J. C. Carlile Corporation, Dept. CP, 425 Cooper Building, Denver 2, Colorado . . . or for more information reader may simply check CP 3173 on the convenient Reader Service slip which is located opposite last page.)

Submerged combustion burners described in bulletin

Illustrated two-page bulletin discusses high-velocity burners for submerged combustion heating of liquids. Units use either gas or oil as fuel. Equipment is extremely compact and is unique in that combustion takes place external to the liquid being heated.

Rated outputs up to 5 million Btu per hr in a single tube may be obtained.

Bul 110 is issued by Thermal Research & Engineering Corporation, Dept. CP, Conshohocken, Pa. When inquiring specify CP 3174 on the convenient Reader Service slip which is located opposite last page.

**No water connection required
on freeze-drying unit . . .**

comes complete, ready to operate; simply plug into wall outlet, add dry ice, and start pump

Uses: Small-scale freeze-drying applications.

Features: Unit comes complete, ready to operate . . . simply plug into electrical outlet, add dry ice to cold trap, put frozen material into cabinet, and start pump. No water connection is required.

Description: Packaged unit includes an electrically-heated drying cabinet, a dry ice and acetone cold trap, and a two-stage, rotary gas ballast pump. Latter can produce vacuum in drying cabinet below one micron of mercury. Gas ballast feature of pump prevents water vapor from condensing in pump oil and assures maximum pump efficiency.

Overall dimensions of unit are: 30" wide, 60" high, and 30" deep. Drying cabinet is 16" wide, 16" high, and 24" deep. Cold trap has capacity of 1850 ml water. Heat supply is 1000 watts. Current to heaters in top and bottom of cabinet is controlled by variable transformer. All gages, controls are on front.

(Model 3501 freeze-drying unit is product of National Research Corporation, Equipment Division, Dept. CP, 160 Charlemont Street, Newton Highland 61, Mass. Check CP 3175 opposite last page.)

**Fluosystem dries
fine coal**

Fluosolids system for drying fine coal is discussed in four-page bulletin. Literature describes operation, advantages, theory, and background of technique. Operating results from the first commercial installation are also cited.

Bul 7503 is issued by Dorr-Oliver Inc., Dept. CP, Barry Place, Stamford, Conn. When inquiring specify CP 3176 on form opposite last page.



"They don't seem to list Cat Crackers, sir — are they anything like dog biscuits?"

COSTS OF BETTER BLENDS CUT TWO TESTED WAYS



**ENGINEERING
BLENDING
AND OTHER
DRY PROCESSES
TO SPECIFICATIONS**

... comes naturally to Sturtevant Engineers. They have a tradition of solving dry-processing problems since 1873. Sturtevant custom-built equipment and plants are well-known for their low-maintenance-cost operation. If your problems include any of the processes listed on the coupon, it will pay you to investigate.

Sturtevant Dry-Batch Blenders:

1. SPEED UP PRODUCTION WITH 4-WAY MIXING
2. SHORTEN SHUT-DOWNS WITH "OPEN-DOOR" DESIGN

Batches from 500 to 40,000 pounds come out of Sturtevant Dry-Batch Blenders exactly as you want them. They are completely blended regardless of the varying weights, densities or fineness of the different ingredients. And no dust is lost in the process. Four different vertical and lateral mixing actions inside the sealed rotating drum achieve thorough blend-

ing in minimum time. Single lever control of a single gate speeds up loading and discharging.

"Open-Door" accessibility makes cleaning and maintenance a matter of minutes. This original Sturtevant advantage plus 75-year-tested rugged construction assures more output per machine-year. Check the coupon for more information.

STURTEVANT

Dry Processing Equipment

The "OPEN-DOOR" to lower operating costs over more years

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

My dry-process materials are:

Desired capacity is:

Name

Firm

Street

City

Title

Zone

State

STURTEVANT MILL COMPANY, 119 Clayton Street, Boston 22, Mass.

Please send me your bulletin on Dry Blenders

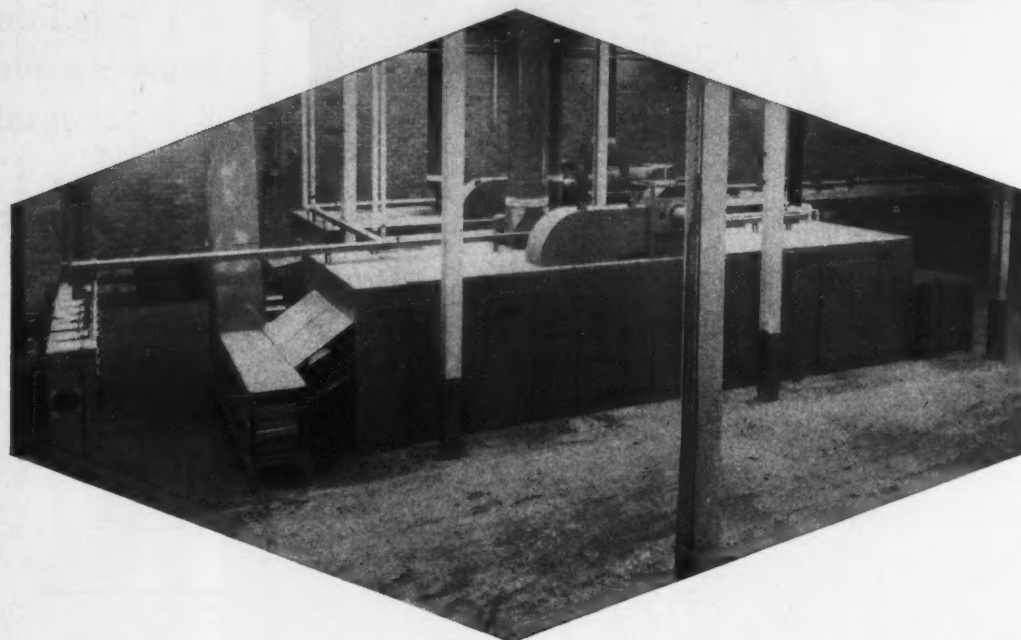
Also bulletins on machines for:

- ☐ CRUSHING ☐ GRINDING ☐ PULVERIZING
☐ MICRON-GRINDING ☐ SEPARATING ☐ BLENDING
☐ SUPERFINE ☐ GRANULATING ☐ CONVEYING
☐ SELECTING

When inquiring check CP 3177 opposite last page



DRYING RANGE means a **PROFIT!**



Efficient drying per pound of product can often mean more direct profit to you than an increased sales volume! Proctor equipment provides the control, flexibility, and construction features essential to profitable drying performance. The result—increased yield of highest quality product. Write or phone today for complete information.

Product Uniformity is of utmost importance to every food processor, at all stages of processing.

Shown above is one of many Proctor & Schwartz dryer installations in one of the country's larger food plants—typical of the many in use in the food industry today. Here, because of Proctor drying skills, uniformity of color, taste, and overall customer appeal is maintained at uniformity highest levels—yields are greatly increased!

- ★ HIGHEST PRODUCT UNIFORMITY
- ★ INCREASED YIELD
- ★ GUARANTEED PRODUCT QUALITY
- ★ "W/M" CONSTRUCTION
- ★ FLEXIBILITY OF OPERATION

PROCTOR DRYING EQUIPMENT FOR THE FOOD AND PROCESS INDUSTRIES

- Tray Dryers
- Truck Dryers
- Pre-Forming Feeds
- Continuous Conveyor Dryers
- Spray Dryers



PROCTOR & SCHWARTZ, Inc.

Manufacturers of Industrial Drying
Equipment and Textile Machinery,
Philadelphia 20, Pa.

When inquiring check CP 3178 opposite last page

PROCESSING EQUIPMENT

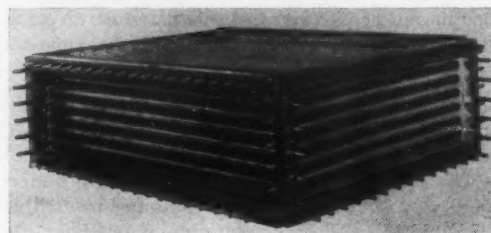
**Waste gas heat exchanger
withstands 100 psi
and 1100°F...**

surfaces covered with nickel-base brazing alloy

Uses: Recovery of heat from high-temperature waste gases.

Features: Heat exchanger is designed to withstand conditions up to 1100°F and 100 psi.

Description: The G-R plate-fin exchanger is of compact cross-flow design, with extended surface consisting of corrugations on both the "shell" and "tube" sides. As shown in accompanying photograph,



Typical single-cell plate-fin heat exchanger for recovering heat from waste gases. Compact cross-flow unit is designed primarily for gas-to-gas service. "Shell side" entrance is at left and "tube side" entrance at right. Any number of cells can be arranged in a single framework

individual cell of exchanger consists essentially of three simple parts: 1) the corrugated sheets, 2) the formed and butt-welded flat tubes, and 3) the blanked and extruded metal tube sheets.

All sealing surfaces are heliarc welded and are covered with a protective nickel-base brazing alloy which also joins the corrugated sheets to the tubes.

Alloy was specially developed to resist high-temperature oxidation and corrosion from hot combustion products, sea water, acids, and other chemicals.

Tentative standard for cell dimensions involves use of six tubes per cell, each tube with a tube-side flow length of 50" and a shell-side flow length of 20".

Extended surface inside tube consists of five corrugated sheets, each measuring 20" across corrugations by 10" parallel to corrugations. Similarly, the extended surface between each pair of tubes consists of two corrugated sheets, each 50" across corrugations by 10" parallel to corrugations.

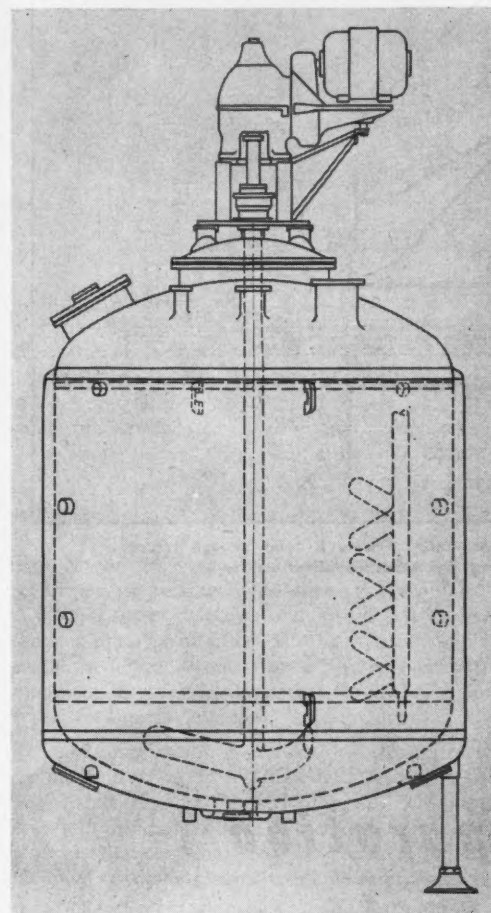
Any number of cells can be arranged within a single flange framework in any series-parallel grouping to satisfy specific requirements.

(G-R plate-fin heat exchangers are product of The Griscom-Russell Company, a subsidiary of General Precision Equipment Corporation, Dept. CP, 661 Third Street, S. E., Massillon, Ohio . . . or for more information reader may simply specify CP 3179 on Reader Service slip which is located opposite last page.)

**Glassed-steel reactors available
in 3000, 4000 gal sizes . . .**

many design changes in new models

The Pfaudler Company has extended its line of standard glassed-steel reactors to include models with capacities of 3000 and 4000 gal. A number of design changes have been incorporated in the new units. Drive support is mounted on a separable



Drawing shows design of large glassed-steel reactors

center cover, permitting removal of the drive and agitator assembly without disturbing the nozzle connections.

Manhole has been located near side of vessel, making it readily accessible for opening and entering. Diameter of the manhole opening has been increased from 12x16" to an 18" round opening. Bottom outlet is offset from center of tank, permitting agitator to sweep settling material clear of outlet.

(Series "R" reactors are product of The Pfaudler Company, Dept. CP, 1000 West Avenue, Rochester, N. Y. Check CP 3181, opposite last page.)

MEET THE production champions OF THE process INDUSTRY

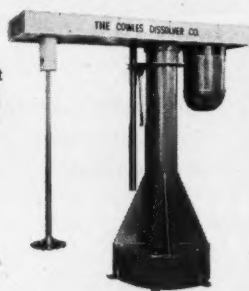
You need **COWLES**
DISSOLVERS

If you process . . . Plastics, Resins, Paints, Vitamins, Plasticols, Nitro-Cellulose Lacquers, Rubber Solutions, Inks, Various Chemical Agents, Organosols, Gum Solutions, Enamels, Biologicals, Coatings, Explosives, Foods.

Because you are guaranteed . . .
FASTER DISSOLVING • FASTER ULTIMATE DISPERSION
• SAVINGS IN TIME, SPACE, LABOR, MAINTENANCE
COWLES DISSOLVERS are actually 2 to 20 times faster than conventional dissolving-dispersing equipment as the COWLES ultra-fast impeller whirls at speeds up to 7500 f.p.m. This keeps the batch in constant circulation, eliminating dead spots and surface splash — minimizing sedimentation.



Drive Units—
Stainless shaft
and impellers.
H/P: Up to 60
Shaft length:
Suitable as
required.
RPM: 7200
to 1800



Hydraulic Lift Models Standard
models up to 50 H/P with 58"
rise. Greater H/P with higher
rise available for special appli-
cations.



Tip-up Models for maximum ver-
satility—3 to 7½ H/P, 900 to
3600 RPM., for operation in
tanks up to 48" in diameter and
24" to 48" high.

COWLES DISSOLVERS are engineered to meet your specific requirements—designed to fit into and add speed to your present production line. The Dissolver's versatility often allows it to do the job of two or more conventional machines.

¡Atención!
Tenemos disponi-
ble literatura
en una variedad
de idiomas.
Escribanos en su
propio idioma.



You need **MOREHOUSE**
MILLS

If you process . . . Paints, Inks, Foods, Chemicals, Plastics, Lubricants, Ceramics.

Because you are guaranteed . . .
• FASTER PARTICLE REDUCTION • SMOOTHER, FINER
END PRODUCTS • THE ULTIMATE IN FINISHED MILL-
ING • ACCURATE REPRODUCTION OF GRIND RE-
QUIREMENTS

MODERN MOREHOUSE MILLS are used the
WORLD over to improve both corrosive
and non-corrosive materials . . . for grind-
ing, homogenizing, emulsifying, dispers-
ing, disintegrating, blending.

MODERN MOREHOUSE MILLS give you up
to 4 times the volume of ordinary mills
when used with conventional pre-mixers
— with the Cowles up to 10 times more.



Model M,
capacity 160
gals. per day*



Model B-1400, capacity
3000 gals. per day*



Model B-2000, capacity
7500 gals. per day*

*Capacities
shown per
8 hr. day.

... and Model A-200
laboratory mill

Individual mill capacities with ordinary pre-mix
range from 160 to 7500 gals. per 8-hr. day — with
Cowles much more.

You need both . . . working as a team to
have the *fastest, most economical, flexible*
production line.

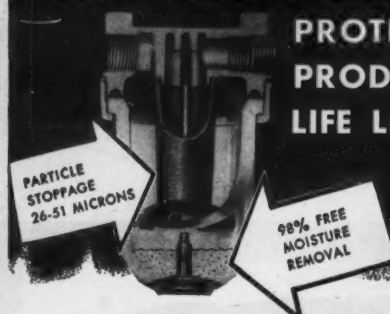
TOGETHER MOREHOUSE-COWLES spell *speed*
and speed spells *higher profits*. Both fully
guaranteed. So before you buy any equip-
ment at any price, write today for full in-
formation and free consultation.

MOREHOUSE-COWLES, INC., 1150 San Fernando Road, Los Angeles, Calif.
Sales Offices in Principal Cities (Cable Address "Morespeed," Los Angeles)

When inquiring check CP 3182 opposite last page

Arrow AIR LINE FILTER

PROTECTS
PRODUCTION
LIFE LINES



**Arrow Autopneumatic Controls
Prevent Work Stoppage — Save Repairs**



- IMPROVE MACHINE AND TOOL EFFICIENCY
- LOWER MAINTENANCE AND REPAIR COSTS
- LESS AIR POWER WASTE—HIGHER OUTPUT

You get every ounce of performance out of your air-powered equipment, cylinders, valves, impact wrenches, tools, etc. with the **ARROW AUTOPNEUMATIC CONTROL ASSEMBLY**. The compressed air is properly cleaned. The Regulator Valve controls pressure without waste of air and the **ARROW Lubricator** supplies the correct amount of fine oil mist in the air stream to properly lubricate appliances or tools in operation. The Automatic Trap discharges accumulated sludge to give perfectly conditioned and controlled compressed air for uninterrupted production schedules.

Tool down-time, operator lost time, parts replacements and expensive repairs are practically eliminated.

**All the Facts Are
Yours for the Asking**



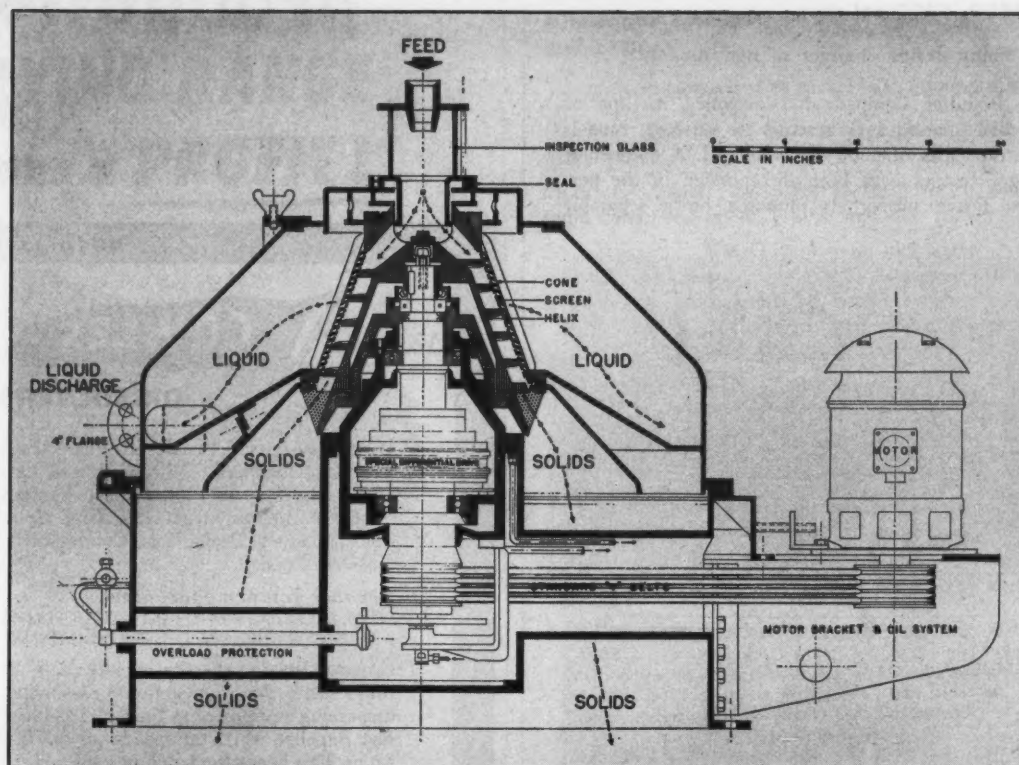
Let **ARROW** field consultants point the way to better production economy at no cost to you. **ARROW** will be happy to send you their engineering catalog and make recommendations. Your inquiries invited.



ARROW TOOLS, INC.
1904 S. KOSTNER AVE. • CHICAGO 23, ILL.

When inquiring check CP 3183 opposite last page

processing equipment



Cut-away shows design, operation of centrifugal screen separator. Filtrate is spun through screen at about 1800 CG's (centrifugal gravities), leaving dry solids deposited on screen

Combination screen-centrifuge will dewater, clarify, segregate. Near-dry cake can be obtained from unit which provides . . .

*efficient separation
at low cost*

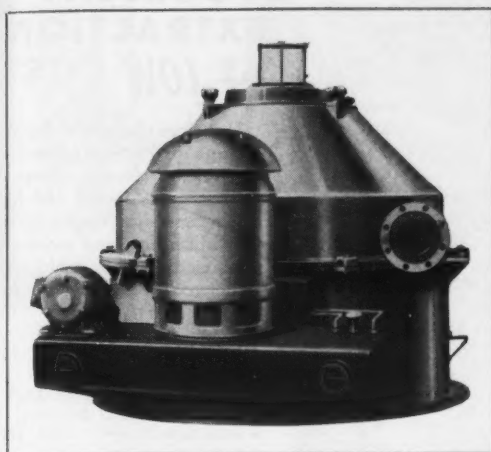
Uses: Continuous separation of slurries into filtrates and solids.

Features: Machine combines the features of a centrifuge and screen to provide efficient separation at low cost. Continuous operation results in high capacity.

Description: Mercone liquid-solid separator uses a centrifugal screen to dewater, clarify, segregate, produce a near-dry cake, or accomplish two or more of these steps simultaneously. Patterned after the German-made Contessor separator, unit

is believed to be first of this type to be produced in US.

Feed is by gravity through top of machine. Filtrate is spun through screen by a force of approximately 1800 CG's (centrifugal gravities). Screen is supported by a perforated cone. Solids are dispersed on screen and are pushed spirally along it by a helix conveyor. Since screen cone diameter gradually increases from top to bottom, solids pass through zone of highest centrifugal force just before discharge.



Machine looks like this on outside

Liquid discharge is also facilitated by the increasing cone diameter. At smaller diameter, when the dry solids are first starting to form, the CG's are lowest — preventing the forcing of fine solids through the screen. As cone diameter increases, solids themselves form a filter bed that becomes more dense in the zone of highest CG's.

Units are available with hp ranging from 20 to 30, and speeds of 2400, 2800, and 3200 rpm (Typical 25-hp machine can handle 12,000 lb/hr, producing cake having 3% moisture). Screens are slotted, perforated, or punched, with openings from 0.002" to 0.027". Speed selection and screen size are dependent upon results desired. If a clear filtrate is sought, a 0.002" screen is generally satisfactory. If maximum dryness is important, high CG's and lower feed rates are used.

Standard construction is 316 stainless steel. Screens are made in a variety of materials. Separator has base diameter of 54", is 50" high, and 77" long. Unit requires only simple foundation for permanent installation. Simplicity of construction and minimum of moving parts result in easy operation.

(Mercone Centrifugal Screen is product of Merco Centrifugal Company, Dept. CP, 150 Green St., San Francisco 11, Calif. Check CP 3184 opp. last page.)

Mixer speeds operations

Mixing unit, mounted on easy-rolling truck, is described in two-page folder. Designed for use in dye house or finishing room, the mobile unit is reported to save up to 84% of mixing time.

"Pako Hydromixer" is issued by Pako Corp., Dept. CP, 1010 Lyndale Avenue North, Minneapolis 11, Minn. Check CP 3185 opp. last page.

LOUISVILLE DRYERS are fitted to your job for faster, more efficient performance—lower cost in the long run!



FOLLOW-UP CHECKS AFTER INSTALLATION TO GUARANTEE MECHANICAL PERFECTION AND EFFICIENCY

LOUISVILLE METHOD

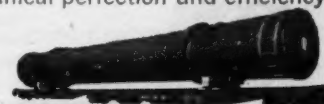
1. Initial survey and analysis of your particular problems.
2. Pre-testing in pilot-plant operation to assure performance.
3. Accurate design to meet your specific needs.
4. Top-quality fabrication in General American's own shops.
5. Follow-up checks after installation to guarantee mechanical perfection and efficiency.



LOUISVILLE DRYING MACHINERY UNIT

GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer Sales Offices: 139 South Fourth Street • Louisville 2, Kentucky
380 Madison Avenue • New York 17, New York
General Offices: 135 South La Salle Street • Chicago 90, Illinois



When inquiring check CP 3186 opposite last page

what is your
PULVERIZING
problem?

accept this offer by
Schutz-O'Neill for a

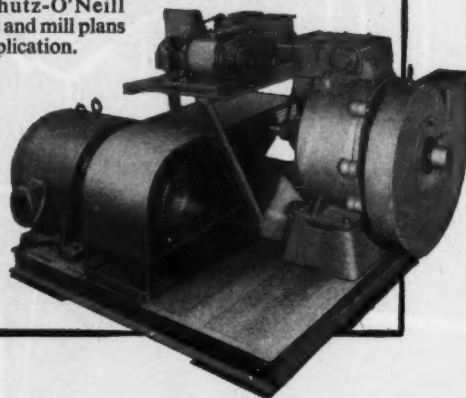
FREE TEST GRIND OF YOUR MATERIAL SAMPLE

Without obligation to you, we'll grind a sample of your material in our Pilot plant, using a production model Schutz-O'Neill Superfine Pulverizer. This is a bonafide, no-strings offer to demonstrate to you the versatility, particle size range and capacity of Schutz-O'Neill Pulverizers. Write us for details.

OUR ENGINEERING TEST REPORT together with your processed product will be returned to you giving exact data and recommended Schutz-O'Neill equipment, methods and mill plans for your process application.

SCHUTZ-O'NEILL PILOT PLANT

uses a standard production model 16" Superfine Pulverizer, which provides up to 100 different pulverizing set-ups with a grinding range from 40 mesh to 5 microns.



ULTRAFINE GRINDING WITH CONTROLLED PARTICLE SIZE RANGE

You'll find Schutz-O'Neill Superfine Pulverizers best for ultrafine grinding with controlled particle size distribution—yet their versatility also makes them adaptable to the complete grinding range from coarse to ultrafine.

Many heat sensitive products can be safely pulverized, because the grinding principle of impact with air attrition embodied in Schutz-O'Neill design keeps product temperatures down and helps control uniformity.

Typical Schutz-O'Neill applications are in the paint industry; major cocoa powder, sugar, spice and pharmaceutical manufacturers; processors of emulsifier gums, resin, plastic and seaweed extract powders and a great number of others. From 62 years of continuous manufacturing and field experience, Schutz-O'Neill may already have the answer to your problem. Superfine Pulverizers are made in six sizes ranging from 7½ to 125 horsepower with grinding chambers 12" to 28" in diameter.

WRITE US
FOR DETAILS
OF TEST
GRIND OFFER

Tell us your milling requirement—fineness, uniformity, increased output, lower cost—send us a sample of the stock you want to pulverize, state fineness and capacity desired, or send for Schutz-O'Neill bulletin.



SCHUTZ-O'NEILL COMPANY

343 Portland Avenue • Minneapolis 15, Minnesota

PULVERIZERS
GRANULATORS
ROLLER MILLS
AIR CLASSIFIERS
SIFTERS
HAMMERMILLS

PROCESSING

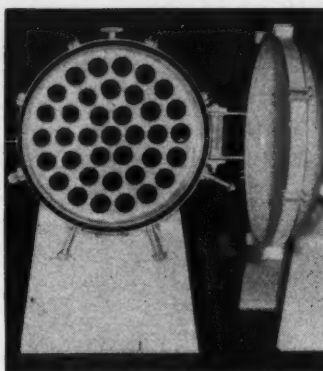
**Tubular filters designed
for low maintenance,
simple operation**

Uses: Filtering liquids containing small percentage of solids. Units are particularly suitable as polishing filters, trap filters, or for filtering run-off from larger filters.

Features: Designed for simplified operation and low maintenance. Filter can be used with or without precoat.

Description: Units consist essentially of a series of perforated metal tubes mounted horizontally inside a filter tank. Each tube has a paper liner in it. Sealing rings fit the liner snugly to the tube. Rear end of tube is domed for the same purpose.

Filter is designed so that fluid moves through the inside of the tubes and passes out the perforated



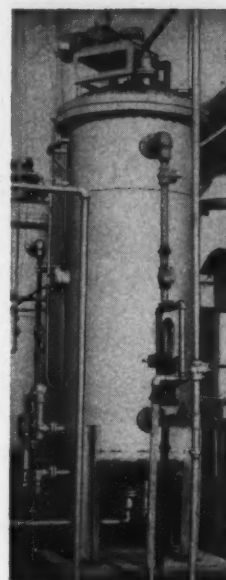
Filter consists essentially of a series of perforated metal tubes mounted horizontally inside tank

wall through the filter paper. Filter is cleaned by simply removing the used liner and replacing it by rolling flat sheets of filter paper and inserting them in the tubes.

Standard sizes are available ranging from 1 to 36 tubes, with filtration areas from 2.4 to 86.4 sq ft. Filters can be ordered in wide range of materials and can be lined for corrosive fluids.

(Type TS tubular filters are product of Industrial Filter & Pump Mfg. Co., Dept. CP, 5900 Ogden Avenue, Chicago 50, Illinois . . . or for more information check CP 3188 on form opposite last page.)

Efficient/Practical SOLVENT EXTRACTION AT LOW COST



The York-Scheibel multi-stage extraction column is ideal for simple counter-current extraction; and for fractional liquid extraction in which the feed material is simultaneously contacted by two selective and immiscible solvents.

Check these features . . .

- POSITIVE MIXING
- POSITIVE PHASE SEPARATION
- SINGLE, COMPACT COLUMN
- HIGH THROUGHPUT CAPACITY
- HIGH EFFICIENCY
- LOW STAGE HEIGHT
- LOW COST PER STAGE.

YORK

YORK PROCESS EQUIPMENT CORP.

4 Central Avenue
WEST ORANGE, N. J.

Complete illustrated catalog available describing laboratory, pilot plant and large scale extraction columns.

When inquiring check CP 3189 opposite last page

Do you have a VACUUM PROBLEM?

Solve it with a simple,
economical I-R EJECTOR

It's surprising how many vacuum problems can be solved by I-R steam-jet ejectors. Often these simple, economical devices can utilize steam that would otherwise be wasted, thus saving the cost of more elaborate vacuum equipment.

Your nearest Ingersoll-Rand branch office or representative will be glad to help you determine the size and construction best suited to your operating conditions. Write us for Bulletin 9013-A. 4-135



Ingersoll-Rand

11 Broadway, New York 4, N. Y.



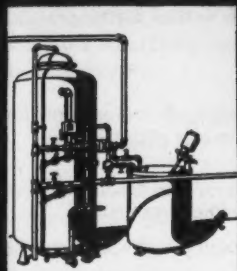
PUMPS • COMPRESSORS • TURBO-BLOWERS • VACUUM EQUIPMENT
AIR & ELECTRIC TOOLS • GAS & DIESEL ENGINES

When inquiring check CP 3190 opposite last page

CHEMICAL PROCESSING

When inquiring check CP 3187 opposite last page

Mixed-Bed Ultra Delonizer



**REMOVES
ALL MINERAL
IMPURITIES
FROM WATER
for as little as
18c per
1000 gallons**

The Elgin Ultra-Delonizer produces water of even higher quality than obtained by distillation or evaporation at a mere fraction of the cost. It is a compact, easy to operate unit which requires very little space. Containing a mixture of cation and anion exchange resins in a single tank, it is low in investment and operating cost. Ask for Bulletin 512.

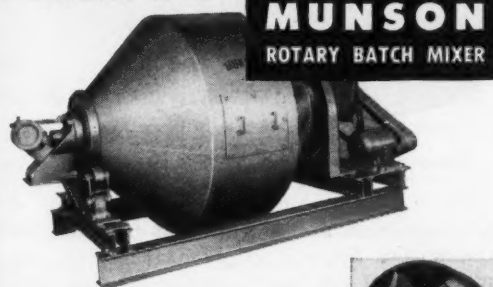
ELGIN SOFTENER CORPORATION

180 NORTH GROVE AVENUE, ELGIN, ILLINOIS

OTHER PRODUCTS Softeners • Dealkalizers • Lime Soda Softeners
Write for Bulletins • Deaerating Heaters • Filters • Treatment

When inquiring check CP 3191 opposite last page

**For faster, more accurate
blending of dry ingredients
...make it a**



**MUNSON
ROTARY BATCH MIXER**

Unequalled for dry mixing of chemicals, insecticides, powdered metals, fibrous materials, fertilizers, gelatin, glue, soap compounds, etc. Available in capacities from 20 to 250 cu. ft. Provides faster, more accurate blending, yet will not grind or reduce size of particles. Can be fitted with internal spray for introduction of limited amount of liquid.

Write for Details

MUNSON MILL MACHINERY CO.

Dept. P-156, Utica, New York

When inquiring check CP 3192 opposite last page



**EXCLUSIVE
MULTIPLE-BLENDING
ACTION**

Lifters cut out and lift ingredients. Rotating cone tumbles stock. Empties completely after every mix.

PROCESSING

**Large molding machine
has 2000-ton clamp
pressure . . .**

close temperature control provided by control center

Large 300-ounce horizontal injection molding machine installed at General Machine and Tool Works, Inc., Walled Lake, Michigan, is capable of 2000-ton clamping pressure, and has up to 48" x 72" die capacity. Machine weighs 130 tons. Unit is used for molding large refrigerator door panels at about 20,000 psi.

Uniform, high quality is consistently maintained because of the extra-large heating area in the cylinder and close temperature control provided by "control center". Accurate control permits use of machine cycling speeds of 50 seconds.

The pre-wired, custom-designed, control center incorporates six Capacitors, contactors, relays, and electrical inter-locks necessary for complete operation of the machine. Large access doors in control center assure faster, easier service, and eliminated costly installation time.

(Horizontal injection molding machine was built by Watson-Stillman Company, Division of H. K. Porter Company, Inc., Dept. CP, 131 Aldene Road, Roselle, N. J. . . or for more information check CP 3193 on form opposite last page.)

(Control center was manufactured by Wheelco Instruments Division, Barber-Colman Company, Dept. CP, 1300 Rock Street, Rockford, Illinois. Check CP 3193A opposite last page.)

Operating characteristics of nitrogen generators

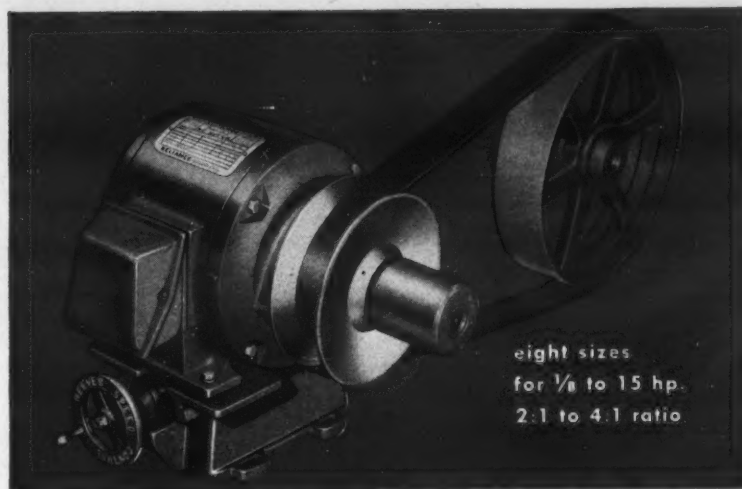
Nitrogen generators are reviewed in six-page illustrated bulletin. Data chart specifies utility requirements for nine models.

Bul. I-100 is issued by C. M. Kemp Mfg. Co., Dept. CP, 405 E. Oliver St., Baltimore 2, Md. When inquiring specify CP 3194 opposite last page.

Now—all from one source



- VARI-SPEED MOTOR PULLEY
- ADJUSTABLE MOTOR BASE
- VARI-SPEED BELT
- RELIANCE AC MOTOR
- DRIVEN PULLEY

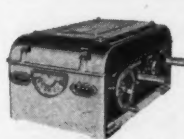


eight sizes
for 1/8 to 15 hp.
2:1 to 4:1 ratio

REEVES Vari-Speed Motor Pulley

This simple, compact REEVES unit provides an economical way to widen machine range, and an efficient method of adjusting work flow to changing conditions. Speed variations are effected smoothly and instantly—without stopping the machine! Unit also available without motor. For bulletin complete with rating charts and dimensions, write Department CP18a-V545.

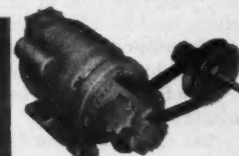
THE RIGHT SPEED FOR EVERY NEED!



Transmission
Heavy duty—2:1 to 16:1
range—fractional hp. to
87 hp.



Vari-Speed Motordrive
Compact—2:1 to 6:1
range—sizes to 40 hp.—
fractional with 10:1.



Flex-Speed
Versatile, economical—
8:1 range—1/2, 3/4 and
1 hp.

The wide range of REEVES variable speed equipment is now supplemented by the line of Reliance drives. Now—more than ever—you can rely on your REEVES representative for the answer to any speed control problem.

REEVES PULLEY COMPANY, COLUMBUS, INDIANA
Division of RELIANCE Electric and Engineering Co.

When inquiring check CP 3195 opposite last page

NEW!



Porous stainless steel (15-diameter magnification)

Cuno PORO-KLEAN filter stops 3-to 30-micron particles at 900°F

Cuno's new PORO-KLEAN offers true micronic filtration at temperatures that melt tin, bismuth, cadmium, lead or zinc.

High temperatures, high viscosity, high pressure drops and corrosive fluids don't faze this new filter.

It's all metal—absolutely lint-free. There's no contamination of the filtered fluid.

It's strong. PORO-KLEAN filters already in operation take a pressure drop of 1500 psi. PORO-KLEAN porous stainless steel has been used for structural parts in aircraft to achieve boundary layer control and transpiration cooling.

It's corrosion resistant. Standard in 316 stainless steel. Low carbon content (0.03 to 0.05% max.) prevents carbon precipitation at welds or during fabrication.

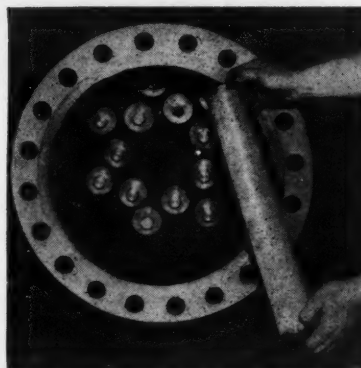
It's easily cleaned—in place, by backwashing with pre-filtered fluid or inert gas; or, when removed, with suitable solvent. May be sterilized with live steam for food or drug processing; or will filter rust and scale from steam used for other cleaning or sterilizing.

Its porosity is closely controlled. Four standard grades cover the range from 3- to 30-micron statistical particle retention.

Standard designs. For most applications standard housings and elements are available.

Get all the facts on Cuno's new PORO-KLEAN filter for your chemical or process applications. Write Cuno Engineering Corporation, 32-1 So. Vine Street, Meriden, Conn.

53



THIS PORO-KLEAN FILTER handles 180 gpm of naphtha at 400°F. Operating pressure: 700 psi ASME Code with 5 psi pressure drop. It's cleaned by back-flushing with nitrogen. Cell-type PORO-KLEAN filter elements (large picture at top) have large surface area. This unit is 54" L x 9" O.D. and is designed for 1500 psi pressure drop and 550°F.

PROCESSING EQUIPMENT

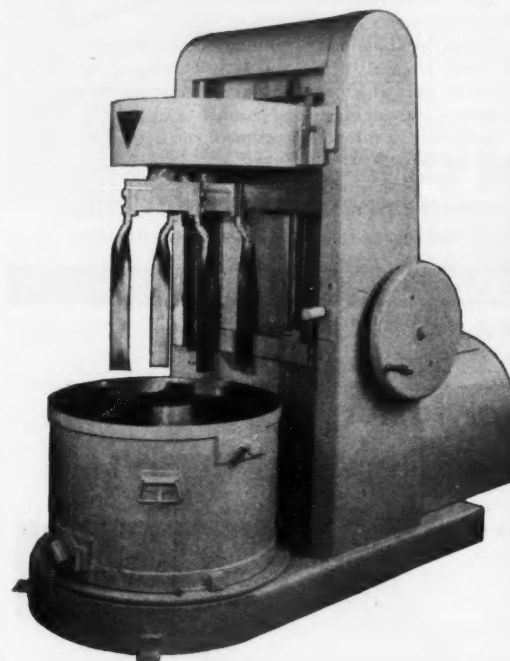
Better mixing provided by "floating" scraper on mixer . . .

forces material from edges of can into mixing area as can rotates on mixer platform

Uses: Mixing chemicals, paints, inks, cosmetics, wood fillers, and similar-bodied materials.

Features: Patented "floating" scraper provides more thorough mixing.

Description: Mixer is equipped with scraper positioning device. As change-can rotates on mixer platform, device rides along edge of can, guiding



Change-can mixer is available in sizes ranging from 8 to 150 gal

the scraper blade so that even out-of-round cans are scraped clean. Action of scraper forces material from inside edge of can into the mixing orbit of unit's double-paddle agitators.

Agitator blades extend to bottom of can, force material at bottom up into mix. All major bearings are of the anti-friction roller type. Mixer is completely enclosed and is available in capacities ranging from 8 to 150 gal. Both vertical-raising and tilting-head types are produced.

(Change-can mixers are product of The Cincinnati Hildebrand Company, Inc., Dept. CP, 3408 Beekman Street, Cincinnati 23, Ohio . . . or for more information reader may simply check CP 3197 on the convenient Reader Service slip which is located opposite last page.)



AUTO-KLEAN (edge-type) • MICRO-KLEAN (fibre cartridge) • FLO-KLEAN (wire-wound) • PORO-KLEAN (porous metal)

When inquiring check CP 3196 opposite last page

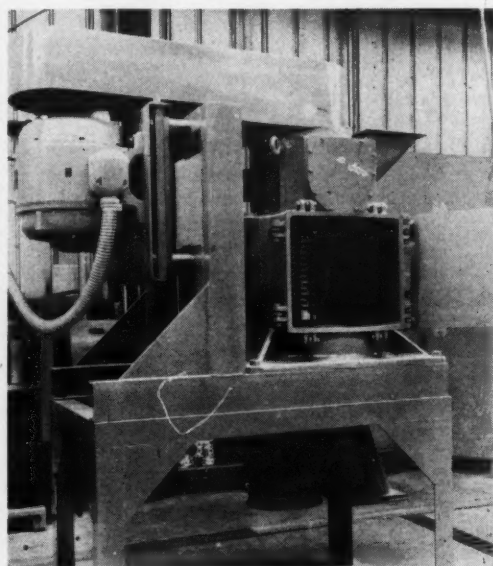
**Side-mounted motor drive
increases flexibility, use
of disintegrator . . .**

minimum vibration simplifies installation:
machine does not have to be bolted to floor

Uses: Continuous grinding, mixing, and size reduction of various materials.

Features: Change to side-mounted motor and belt-drive design increases operating flexibility of units. Minimum vibration means units do not have to be bolted to floor, simplifying installation.

Description: Side-mounted motor and belt-drive gives unit variable-speed operation from 1200 to 5000 rpm, using a 3600-rpm motor with two sets of belts and four pulleys. This combination permits



Side doors swing out to provide easy access to interior

six different speed ranges, with changing time of less than 30 minutes. Belts and pulleys are completely enclosed by a solid removable guard.

Dust-tight and leak-proof operation is assured by heavy plate doors on both sides. These swing back out of way to provide easy access to interior of machine. Unit can be fed from two directions over 90° quadrant or from only one direction as desired. Machine is fitted with hanger bearing for mounting screw conveyors.

Units are available in various sizes with carbon or stainless steel rotors and hammers or with any combination of carbon and stainless.

(Side-mounted belt-driven disintegrators are product of Rietz Manufacturing Company, Dept. CP, 150 Todd Road, Santa Rosa, California . . . or for more information check CP 3198 on form which is located opposite last page.)

*We consider "KARBATE" equipment first--
it costs less and lasts longer!*



*Here's Why
It Pays To Start With*

"Karbate" Impervious Graphite Process Equipment — And Continues To Pay While You Use It:

Low First Cost: Prices of standard, quantity-produced "Karbate" Process Equipment compare favorably with those of other materials less resistant to corrosion. Delivery is quick — generally from stock.

Long Service Life: Unequalled corrosion-resistance, immunity to thermal shock and ruggedness of mechanical design keep "Karbate" Process Equipment on the job with minimum maintenance.

No other material of construction combines the advantages listed above with such other desirable properties as high thermal conductivity, freedom from metallic contamination, ease of fabrication and modification in the field, plus a **complete technical advisory service**. Literature furnished promptly on request.

**Manufactured only by
NATIONAL CARBON COMPANY**

*The term "Karbate" is a registered trade-mark of
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IN CANADA: Union Carbide Canada Limited, Toronto



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S-7250**



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S-6740 and S-6840**



**Cascade Coolers—
Catalog Section
S-6820**



**HCl Absorbers—
Catalog Section
S-7480**

When inquiring check CP 3199 opposite last page

what the
"K"
means to you



... high tensile strength

Standard ASME code specifications call for 21,000 psi for cast fittings. "K" fittings substantially exceed that requirement. They are also Underwriters' laboratory approved.

Uniform wall thickness, good clean threads and chamfers, also assured when you use "K" fittings.

"K" fittings include:

- Standard and Extra Heavy Screwed Steam Fittings.
- Standard and Extra Heavy Flanged Fittings.
- Standard and Extra Heavy Companion Flanges.
- Standard Sprinkler Fittings.
- Standard Drainage Fittings, Black and Galvanized.
- Standard Bushings, Plugs, Flange Unions.

It pays to obtain fittings from distributors who handle the "K" line.



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1800 McCall St., • DAYTON 1, OHIO

Established 1887

K

When inquiring check CP 3200 opposite last page

briefs

from contemporary publications

Aqueous ethylene glycol

Data that deal with densities of ethylene glycol-water at 25°C, and refractive indices at 20°C provide methods of analysis good to 0.11 per cent and 0.03 per cent by weight, respectively. The usual assumption that refractive index is linear with weight percentage composition is shown to be slightly in error. Three pages, two tables, two figures, 11 references. (*"Analytical Chemistry,"* October, 1955, page 1609.)

Noise reduction

Industrial noise can be controlled by selection of site, plant layout techniques, and choice of machines, mountings, and processes. Proper precautions should be taken in the design stage or when moving into a new building or area. Seven pages, 11 figures, seven references. (*"Noise Control,"* September, 1955, page 58.)

Anti-corrosive valves

Selection of valves for control of corrosive fluids includes laboratory and in-service tests, and experience in active plant use. Design of valves and flanged connections is covered. Nine pages, four tables, 11 figures. (*"Corrosion,"* September, 1955, page 406t.)

Reactor waste products

From Harwell, England, comes a discussion of different types of disintegrators, characteristics of fission products that are suitable for isolation, and the scope of future radiation facilities. Ten pages, two tables, six figures, 13 references. (*"Research,"* August, 1955, page 314.)

Detergents

Methods for the evaluation of low-foaming detergents are discussed, including the use of launderometers. Applications of detergents where foam is undesirable are mentioned. Three pages, five tables, three references. (*"Soap,"* September, 1955, p. 50.)

Demineralization

For instrumentation of a plant for demineralizing one million gallons of water per day and clarifying seven million gallons per day, the following items are considered: equipment, water flow, regeneration, waste treatment, and air supply. Four pages, four figures. (*"Instrumentation and Automation,"* September, 1955, page 1532.)

Bubble-cap plates

Relative performance of sieve and bubble-cap plates is discussed under headings of description of equipment, test and analytical procedures, efficiency and entrainment calculations, pressure drops, and costs. Five pages, nine figures, six references. (*"Chemical Engineering Progress,"* September, 1955, page 424.)

Silica pigments in rubber

Part I of this report on the reinforcement of butyl and other synthetic rubbers with silica pigments deals with hydrated silicon dioxide (Hi-Sil 202), heat treatment, associative forces between polymer and silica, Banbury trials, and compounding with GR-S. Nine pages, eight tables, 12 figures, 16 references. (*"Rubber Age,"* September, 1955, page 875.)

abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service to you . . .

Conservation of water

Water conservation value and its measures, discharge water, determination and control of pollution, demineralization of sea water, induced rainfall, and river associations all have a bearing on the use of water resources in the eastern states. Reasons for water shortages are given. Seven pages, six references. (*"Journal of the American Water Works Association,"* September, 1955, page 858.)

Properties of ketones

Critical properties and vapor pressures of six ketones were determined by means of an apparatus that requires only one charge of compound. The data and correlations for critical temperature and pressure are useful for design purposes. Six pages, three tables, seven figures, 16 references. (*"Industrial and Engineering Chemistry,"* September, 1955, page 1767.)

Continuous sampling

This treatment of continuous sampling covers sampling plans, advantages of the Girshick plan, sequential sampling, formulas, setting up a proper procedure, applications, and results. It is backed up with a mathematical appendix. Six pages, six figures, seven references. (*"Industrial Quality Control,"* September, 1955, page 4.)

Urea biuret

U. S. Department of Agriculture reports that at 30°C the rate of nitrification of biuret is lower than that of urea or ammonium sulfate, although little difference in degree of nitrification was observed after fifteen weeks. Experiments on ryegrass were thus confirmed. Three pages, three tables, one figure, three references. (*"Agricultural Chemistry,"* October, 1955, page 49.)

Scouring wool

For scouring of raw stock, yarn, and piece goods, one chooses mechanical equipment, scouring procedures, and detergents in accordance with degree of cleanliness desired, impurities present, and the state of the fiber. Economy, recovery of by-products, counterflow principles, and continuous methods are discussed. Four pages, five tables, five references. (*"American Dye-stuff Reporter,"* October 10, 1955, page 726.)

Rubber deterioration

Several *Streptomyces* strains are responsible for microbiological deterioration of vulcanized rubber. Tests to evaluate efficiency of mercaptobenzothiazole tetramethylthiuram disulfide as preventives were inconclusive. Other methods for controlling microbiological deterioration of rubber are covered. Eight pages, two tables. (*"Applied Microbiology,"* October, 1955, page 302.)

Lighting in the future

In the industrial section of this survey of lighting, trends toward higher levels of illumination, luminous ceilings, increased efficiency, and high-frequency operation of fluorescent lamps are traced. Market outlook is bright! Twenty-two pages, one table, nine figures, 28 photographs. (*"Electrical Construction and Maintenance,"* October, 1955, page 93.)

Sewage training program

Results of a questionnaire sent to personnel in Florida sewage works form a basis for planning an educational program for operators in sewage plants. Duties and job classifications are tabulated. Six pages, nine tables, three figures. (*"Water and Sewage Works,"* October, 1955, page 452.)

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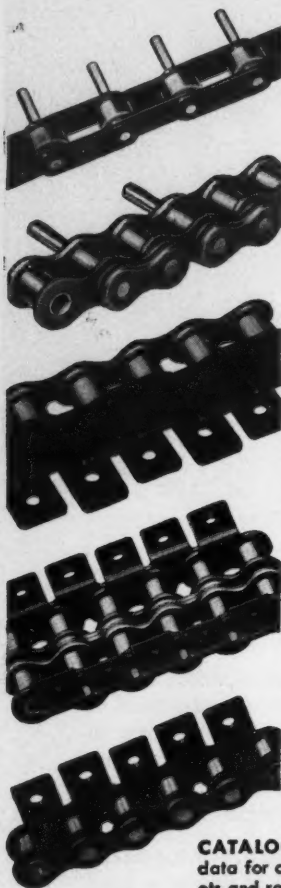
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packaging



Fiber drums are used for some material formerly shipped in steel drums . . .

... while burlap bags hold materials which were formerly shipped in fiber drums

Cost, weight, and space savings are factors as . . .

Dow switches packages

Burlap replaces fiber, and fiber replaces steel for packaging certain moist products

By CP Staff
with HARRY BULL, Packaging Coordinator
Dow Chemical Company, Midland, Michigan

Easier handling, lower shipping costs, and a considerable saving in storage space were among the advantages gained by Dow Chemical Company when they changed to different packaging for a portion of two of their products, Dowex and Saran Latex.

Dowex, an ion exchange resin in the form of small beads containing about 45% moisture, is now packaged in polyethylene-lined burlap bags of $\frac{3}{4}$, 1, and $1\frac{1}{2}$ cu ft capacity. Bags are supplied by Bemis Brothers Bag Co., St. Louis, with liner already inserted. After being filled by weight, polyethylene

liner is tied off with a modified rubber band and burlap is sewn closed.

Shipping weight per pound of product is lowered considerably by utilizing these bags. Also, they are more easily handled and require less unloading time. Material retains its necessary moisture content, and the drum disposal problem is eliminated. Finally, storage space for empty containers is greatly reduced. It is possible to save approximately 30% on storage space of full bags as compared with previously-used fiber containers.

Certain types of Saran Latex, a liquid containing about 52% solids, also are now packaged in a different container. This is a metal-head fiber drum (a product of Continental Can Co., Fiber Drum Div., Van Wert, Ohio) containing a pre-formed

polyethylene liner. After filling, the liner is turned out over edges of drum, a polyethylene disc is placed over the top, and the metal cover is clamped in place leaving a polyethylene-to-polyethylene seal at the cover edge.

The price of this package per pound of latex shipped is cut appreciably compared to that of lined steel container shipment, due to both cheaper package cost and lower shipping weight. In addition, plasticizer in latex softens ordinary drum linings and as a result special drum-lining materials are required.

(Information courtesy The Dow Chemical Company, Midland, Michigan.)

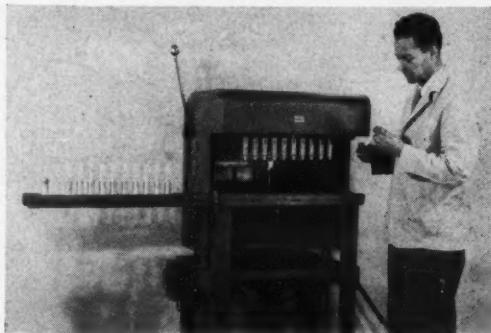
Seals plastic "Bracon" tubes at rates of 60 per minute . . .

sealing operation is automatic after tubes are put in handling rack

Uses: Designed specifically to seal "Bracon" polyethylene tubes, products of Bradley Container Corp., for products such as toothpaste, shaving cream, ointments, etc.

Features: Sealing process is automatic after operator puts empty tubes in handling rack on machine. Tube ends are closed, sealed and cooled by sequence cam arrangement.

Description: Production rates vary, depending on tube size, from 15 per minute for 2½" diam tubes to 60 per minute for ¾" diam tubes. Unit



Unit automatically closes, seals and cools polyethylene collapsible tubes

accommodates tube heights from 2 to 11" and diam from 11 to 60 mm. Track extension for machine provides station for filling tubes. This allows present filling equipment to be used.

(Model TS-1 polyethylene tube sealer is product of Carbert Mfg. Co., Inc., Dept. CP, 144 Moody St., Waltham, Mass. . . or for more information check CP 3203 on handy form opposite last page.)

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in a Gaulin Homogenizer makes many products better — more economically

A Gaulin Homogenizer does three very important things to a product — it shears, expands and explodes, agglomerates down to their ultimate particle size.

The results of this particle acceleration go far beyond just making products uniformly finer, faster, more economically. In most cases, the physical characteristics of a product are modified.

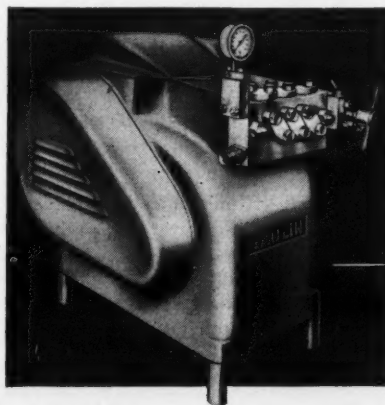
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Improves transparency, clarity, and stops separation, at lower cost than other methods.

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Provides continuous high capacity producing dispersions of ultimate particle size.

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Gives smoother texture, longer shelf-life. Locks in perfume against evaporation.

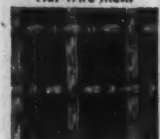
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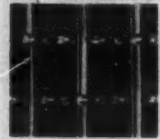
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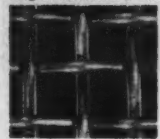
Flat Wire Mesh



Double Intermediate Crimp



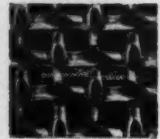
Single Intermediate Crimp



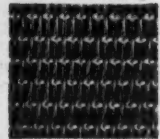
Double Crimped



Twilled Weave



Calendered Backing



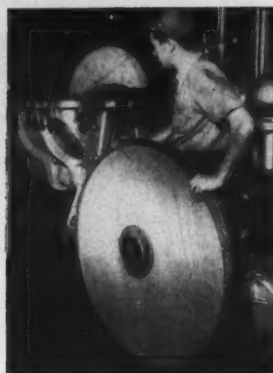
Oblong Mesh



Plain Dutch Filter



Twilled Dutch Filter



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When inquiring check CP 3205 opposite last page

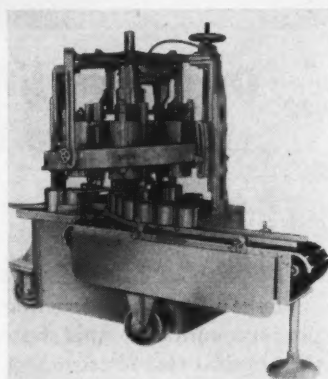
PACKAGING

**No-can, no-fill unit
fills 100 pints
per minute . . .**

mobile filler occupies only 62 x 46" of floor space

Six-valve rotary paint filler makes accurate deliveries in sizes from 1/32 gallon to 1 gallon. Production is up to 100 pints per minute to 35 gallons per minute. Portable unit occupies floor space of only 62 x 46".

Filler is designed for quick removal of valves and pistons for cleaning.



Mobile unit has no-can, no-fill feature

Equipment has variable-speed drive and no-can, no-fill feature.

Rotary unit is available in stationary as well as mobile models.

(High-speed six-valve rotary paint filler is product of Elgin Mfg. Co., Dept. CP, 200 Brook St., Elgin, Ill. . . or for more information check CP 3206 on form opposite last page.)

**Shipping costs lower
with polyethylene
drum liner . . .**

five-gallon liner available for lug-top or close-top pails

Uses: Shipping photographic chemicals, pharmaceuticals, germicides and other materials normally shipped in stainless, glass or molded plastic containers.

Features: Liner, available for

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Order with confidence. Over 30 years' supplying process industries. Highest quality materials and workmanship for durable, corrosion-resistant service. Additional items—beakers, stock pots, batch cans, shovels. Get catalog—Send a trial order.



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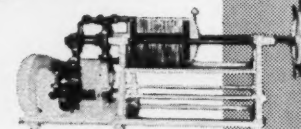
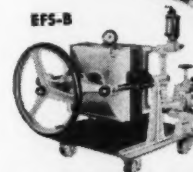
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CHEMICAL PROCESSING



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- A truly portable bag closer . . . Weighs only 10½ pounds.
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- Lowest priced bag closer on the market.

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PACKAGING

five-gallon shipping pails, is integral part of the steel container. Pouring fittings of tin plate or polyethylene are available.



Heavy-gage plastic liner attaches to container opening, fits 16-lug or closed tops

Description: Liner is constructed of polyethylene tubing and sheet material and is attached to the container opening.

(Plastic liner as product of Jones and Laughlin Steel Corp., Dept. CP, 3 Gateway Center, Pittsburgh 30, Pa. . . or for more information check CP 3211 on form opposite last page.)

Describes gravimetric feeding in chemical industry

Reprint of eight pages titled "Continuous Automatic Loss-in-Weight Proportioning and Blending of Tetraethyl Lead to Gasoline", describes gravimetric feeding (feeding by weight) in chemical process industries.

Reprint contains schematic installations, clear photos, and parts diagrams in addition to descriptive information on advantages and safety features of the loss-in-weight system.

File No. SM-2000-2 is available from Proportioners, Inc., Div. of B-I-F Industries, Inc., Dept. CP, 345 Harris Ave., Providence, R. I. When inquiring specify CP 3212 on form opposite last page.

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**SHAKES . . . SETTLES . . . AS IT WEIGHS AND FILLS
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Then, why?... yes, why do some publishers charge a nominal rate for a subscription... but other publishers send their magazines without charge?

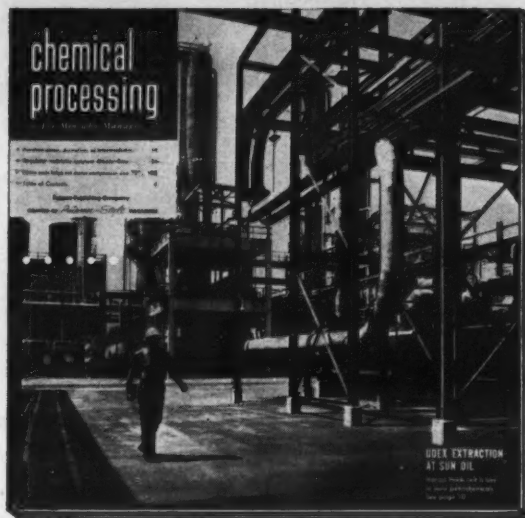
Well, the "paid-subscription" magazine gets a lower postage rate than does the "non-paid subscription" magazine. Some publishers feel this postal advantage is important. So they charge a "token fee" as a subscription price. And so win a lower postage rate.

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CHEMICAL PROCESSING "hand-picks" its readers—for best, effective circulation... and sends the magazine to these key folks, without charge.

You see, you simply can't get maximum coverage of important folks by trying to force them to buy subscriptions. Such men, limited in numbers, are scattered all over the U.S.A.; travel and/or direct mail, cost money; a large share "forget to renew" each year; and, no matter how much time, money, and pressure you put on them, there are always some important men who will never buy.



You don't "pay"—CHEMICAL PROCESSING gets better circulation. So, as you can see, a subscription price is at best but a "token payment." You don't really pay for any magazine with \$3.00 or \$5.00.

But, CHEMICAL PROCESSING gets the best, most effective circulation coverage by "hand-picking" the right readers. This gives values to advertisers which they can't possibly get in any other way.

That's why... CHEMICAL PROCESSING hand-picks only qualified readers... Men Who Manage chemical processing plants... presidents, partners, plant managers, foremen, engineers, chemists, directors of research, etc. Then the editors make the magazine so interesting, so valuable, these folks want to read it.*

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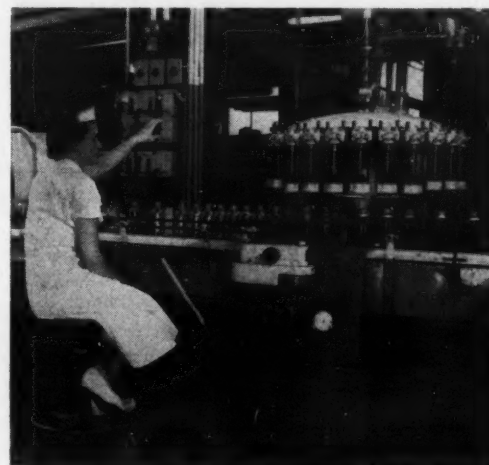
PACKAGING

**Boost production and efficiency
in switch from in-line fillers
to rotary machines**

Pharmaceutical house handles mouthwash, rubbing alcohol and similar materials 2 to 3 times faster

Problem: With a variety of sizes and shapes of bottles to fill, Sharp & Dohme in Philadelphia used semi-automatic hand-fed in-line filling machines. Typical of the five to 16-ounce containers they handle are 'Tyrolaris' mouth wash, 'S.T. 37' antiseptic, 'Alkolave' rubbing alcohol.

While there was nothing radically wrong with filling rates and efficiency, it became evident that faster equipment could pay for itself.



Production on this line reaches 120 bottles per minute

Solution: About two years ago, Sharp & Dohme replaced bottling lines with faster rotary units. Cartons of bottles are supplied to the packaging line. These are unscrambled, blown free of any lint or paper scraps, belted to the filling heads. Here bottles swing off the line and are filled by vacuum-filling to insure that the proper amount of material is allotted to each bottle.

Following the filling and capping operations, bottles move to careful visual inspection before illuminated frosted glass panels. Inspectors transfer bottles to a second belt after they are okayed—a bottle that has not been inspected can't get past this stage. From this point inspected bottles go on to labeling and packing in cartons.

Results: As a rule, this machine runs about 80% of a one or two-shift day. In each six hours of continuous operation, 32,000 bottles can be turned out—equivalent to three to four days of operation under the old system. This fact allows

time for cleaning and minor repair between runs.

After the first six months of inevitable operator reaction, filling equipment made friends with everyone in the plant. Management feels that it has done a very good job and lived up to expectations. Figures tend to bear this idea out — 'Alkolave' production hits about 98% of rated capacity, 'Tyrolaris', 99%.

In terms of production rate, rotary equipment produces 100 to 120 bottles a minute with 9 people on the line: In-line fillers produced 50 a minute with twelve people.

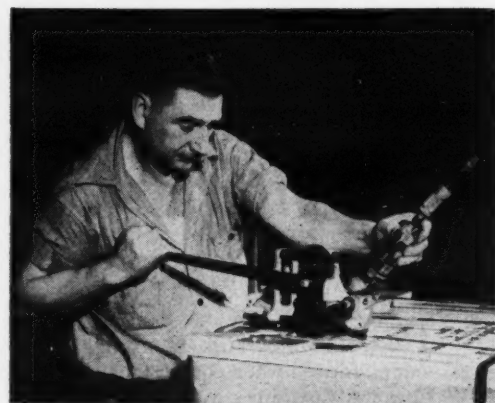
(Rotary filling lines use equipment built by The Karl Kiefer Machine Co., Dept. CP, Cincinnati 2, Ohio. . . . or for more information check CP 3214 on form opposite last page.)

Air-powered strapping machine tensions, seals, cuts in one operation . . .

first automatic strapping tool performs all operations in one move

Uses: Tensions, seals and cuts crop ends from strapping automatically.

Features: Provides uniform, predetermined tension up to 1600 lb with no manual effort. Machine eliminates major cause of operator fatigue.



Unit performs all strapping operations automatically

Description: Unit, only a few pounds heavier than hand operated seal tool, is constructed of cast aluminum alloy. Tool's magazine has capacity of 75 seals. It is designed for use with $\frac{5}{8}$ or $\frac{3}{4}$ " strap.

(Model AP strapping machine is product of Dept. 9P, Signode Steel Strapping Co. Dept. CP, 2600 North Western Ave., Chicago 47, Ill. . . . or for more information reader may simply check CP 3215 on form which is located opposite last page.)



This giant **p-k** twin shell blender has already blended millions of pounds of Durkee seasoning salts, loading efficiently from the floor above and discharging to the floor below. Blending, cleaning and maintenance time have been so reduced that this twin shell paid for itself in only a few months. Stewart Woodruff (right), head of Durkee's research lab, conducted the extensive tests which led to the selection of the twin-shell blender.



"Blends perfectly; virtually self-cleaning":

DURKEE SELECTS **p-k BLENDER AFTER LABORATORY "PRE-TEST"**

We're at Durkee Famous Foods, in Elmhurst, N. Y. . . . and you're looking at a 1000-lb. **p-k** twin shell blender which was so thoroughly pre-tested, success was assured even before it was installed!

Extra-effective blending is a must at Durkee, because physical segregation between various ingredients in Durkee's onion salt and garlic salt is a problem. That's why, when it comes to choosing a blender, there could be no guesswork.

The twin shell, along with other blenders, was put under careful scrutiny. A 4-quart **p-k** laboratory model underwent a series of tests in Durkee research labs.

There, in much less than half the time needed to produce a hand sample of almost perfect theoretical value, the **p-k** twin shell, in test after test, produced identical samples. Because blending results obtained with twin shell lab models scale up accurately to production sizes, Durkee research men knew the twin shell was the "just right" blender for the job—before it was purchased!

To find out how you, too, can "pre-test" a **p-k** twin shell blender in your plant, lab or mill, write us today. Ask, too, for your copy of **p-k** Catalog 13. It is free for the asking, of course. The Patterson-Kelley Co., Inc., 710 Lackawanna Avenue, East Stroudsburg, Penna.

PATTERSON KELLEY

Offices: 101 Park Avenue, New York 17 • Railway Exchange Building, Chicago 4 • 1700 Walnut Street, Philadelphia 3 • 98-A Huntington Avenue, Boston 16 and other principal cities

When inquiring check CP 3216 opposite last page

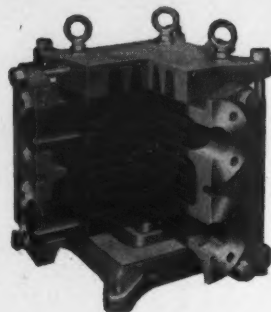
ONLY

Impervite

Gives You All Basic Designs Of IMPERVIOUS GRAPHITE HEAT EXCHANGERS

CUBICAL

Provides greatest amount of transfer surface known for size of exchanger (Example: Model 4 uses 15" cube for 100 sq. ft. effective transfer surface.) IMPERVITE CUBICAL is exceptionally rugged in construction, resists mechanical shock, and can be operated at pressures as high as 100 psi.



TUBE AND SHELL

You get quick shipment on famous standard IMPERVITE tube and shell exchangers in sizes from 7 to 650 tubes. Unusually flexible design and production facilities enable custom units to be fabricated quickly and economically for practically any application.

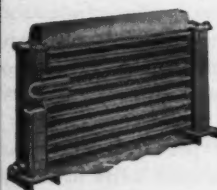


Exchangers shown are also produced from GRAPH-I-TITE, the amazing carbon-impregnated graphite which provides greater chemical resistance and withstands operating temperatures up to 5700° F.



CROSSBORE

This design is an exclusive Falls' development! It withstands operating pressures up to 200 psi, resists steam hammer and is exceptionally easy to clean.



CASCADE

All models utilize specially constructed low-pressure-drop cells. All tubing is extruded by an improved method which practically eliminates spalling at high temperatures and results in more uniform heat transfer characteristics.

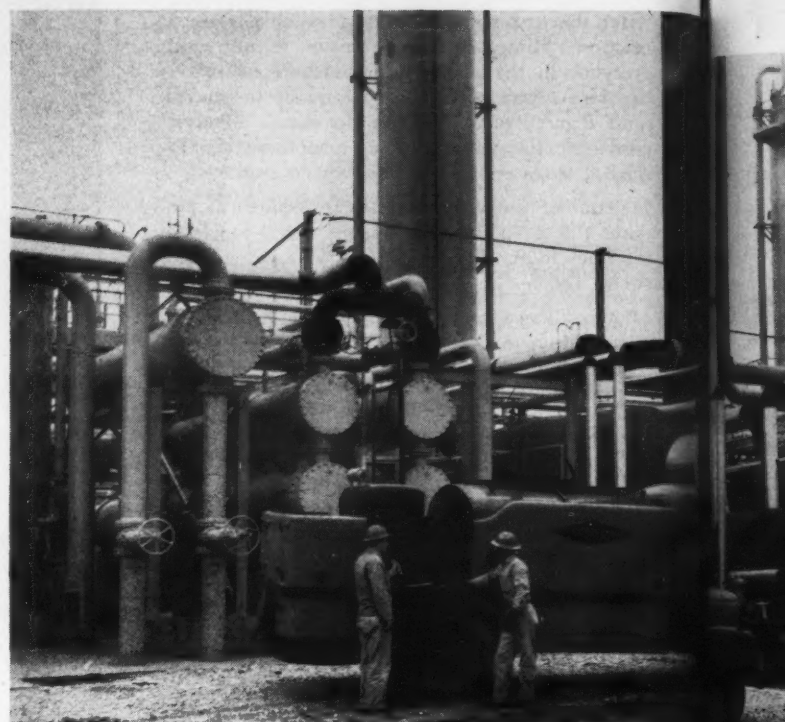
WRITE FOR CATALOGS

Falls Industries Inc.

31909 AURORA ROAD • SOLON, OHIO
PHONE: CH. 8-5357 • TELETYPE NO: Solon 0-720

When inquiring check CP 3217 opposite last page

engineering and maintenance



Preparing for a typical ammonia plant degreasing and mill scaling project

By removing mill scale and grease from process lines and equipment, readying Grace Chemical ammonia plant for service, —

chemical cleaning cuts equipment failures

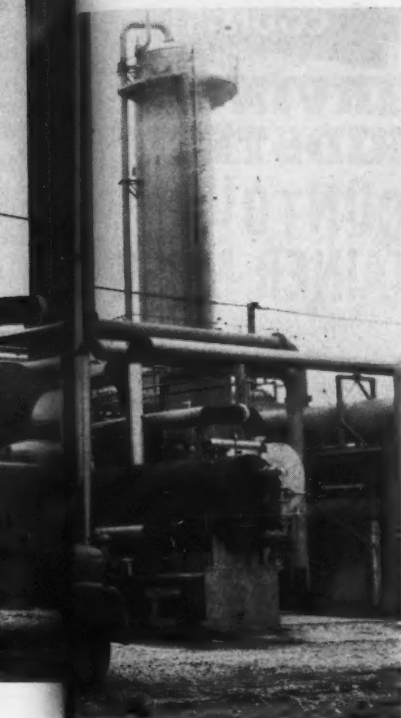
*Cleaning is accomplished in
three weeks while other
methods have taken as long as
three months*

By THEODORE W. WETT, Assistant Editor
with JOHN G. CARRIERE,
Vice Pres. & Plant Mgr.
Grace Chemical Company,
Sub. of W. R. Grace and Co.
Memphis, Tennessee

PROBLEM: Mill scale or other oxides, formed when equipment for Grace Chemical Company's Memphis, Tennessee ammonia plant was fabricated, if left in boilers, towers, and air, gas, and compressor lines would contribute considerably to corrosion and pitting when equipment is in service. It also would reduce effectiveness of process controls and cause excessive wear on compressors and other process equipment. Grease or other hydrocarbon preservatives in oxygen system could cause spontaneous combustion in contact with oxygen.

Mechanical cleaning of comparable systems

CHEMICAL PROCESSING



was known to require as high as three months time and a thorough job was difficult to achieve. Pipe pickled or a sand blasted to remove scale presented a handling problem.

Solution: Before Memphis plant was put into operation Foster Wheeler, builders of the plant, and Grace Chemical arranged to have entire system cleaned chemically. Complete mill scaling and degreasing were performed on synthesis systems, compressor lines and bottles, oxygen system, and two 100,000 pph boilers.

Procedure was as follows: Boilers were preheated slowly to a maximum temperature of 175°F, filled with cleaning solvent and allowed to soak for a predetermined period. They were drained, circulated with water, flushed, and circulated with neutralizing chemicals. Neutralizing material was blown out with inert gas and passivation chemicals pumped in and brought up to positive pressure for four hours.

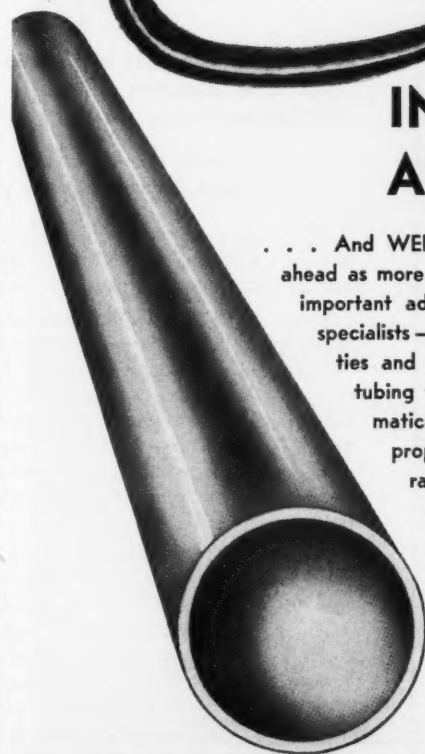
Compressor lines, air system lines, gas, CO₂, and nitrogen lines, and towers were similarly treated except for an initial flushing with hot water and drying with inert gas.

Oxygen system required special treatment since all valves had to be disconnected and hand cleaned to remove all traces of hydrocarbons or greases on stems, bodies, or seats. Entire system was then treated with degreasing solution at 190°F, flushed twice with

(Please turn to next page)



**IN QUALITY, DEPENDABILITY,
AND LONG SERVICE LIFE...**



... And WELDCO Tubular Products keep moving ahead as more and more buyers discover their many important advantages. WELDCO is produced by specialists — men who have the equipment, facilities and experience to manufacture pipe and tubing to your exact specifications. It's automatically machine-welded under pressure, properly formed, carefully finished, accurately sized and straightened, and rigidly checked. And remember, too, only WELDCO is welded with the exclu-

sive Double-Fusion Process. ... It's available in Stainless Steel, Monel, Inconel, Nickel, Cupro-Nickel, and Hastelloy, in tube and pipe sizes from 3" to 30", Schedules 5 and 10, and 3" to 12", Schedule 40. To get lightweight, corrosion-resistant Tubing with complete uniformity and long service life, always specify WELDCO — your best buy in top-quality tubing.

WELDCO

*Whatever Your Needs In Tubing ...
You're 'Way Ahead With WELDCO*

THE YOUNGSTOWN WELDING & ENGINEERING CO.

3728 OAKWOOD AVE.

YOUNGSTOWN 9, OHIO

When inquiring check CP 3218 opposite last page

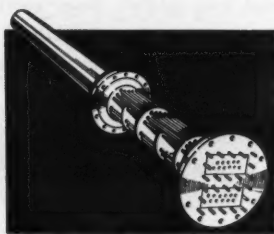
TANTALUM...

We recommend it
only when it is the
cheapest material
AVAILABLE

Tantalum is seldom cheaper on a "per-pound" basis. But tantalum is quite often the "cheapest" material when judged on an over-all final operating cost basis, on a product purity basis, on a freedom from maintenance or an elimination of down-time basis.

We don't expect anyone to take tantalum on faith or generalities. But if you process hydrochloric acid, nitric acid, perchloric acid, bromine, iodine, hydrogen peroxide, sulfuric acid, chlorine, chlorine dioxide (and many other corrosives), tantalum may save you money. Fansteel engineers can tell you, definitely, whether or not tantalum will be "cheapest" for you.

USE TANTALUM WITH ECONOMY for most acid solutions and corrosive gases or vapors, except HF, strong alkalis or substances containing free SO₃.



Write for free book, *TANTALUM in Chemistry*

FANSTEEL METALLURGICAL CORPORATION
NORTH CHICAGO, ILLINOIS, U.S.A.

G563A

When inquiring check CP 3219 opposite last page

ENGINEERING & MAINTENANCE

CHEMICAL CLEANING

(Continued from preceding page)

water, and filled with passivating materials to insure that no oxidation would occur before system was placed in operation. All systems were inspected and found to be clean.

Results: Pitting, corrosion, and equipment wear caused by mill scale have been prevented. Grease and other contaminants were removed from systems eliminating danger of spontaneous combustion. Process controls function effectively.

Entire plant was cleaned in three weeks time compared to three months by mechanical methods. Operation of plant since it went on stream in December 1954 gives every evidence that chemical cleaning was thorough and effective. Possibility of equipment failures from presence of oxides or mill scale has been eliminated.

(For more information on chemical cleaning contact Dowell Inc., Dept. CP, P.O. Box 536, Tulsa, Okla. Check CP 3220 opposite last page.)

Hundreds of quantity adjustments possible on metering pump that has gear train . . .

permits greatly increased range of dispensings
using standard interchangeable gears

Uses: As a gear train drive developed for manufacturer's metering pumps which are used to seal, pot, and cement or fill tubes, jars, bottles.

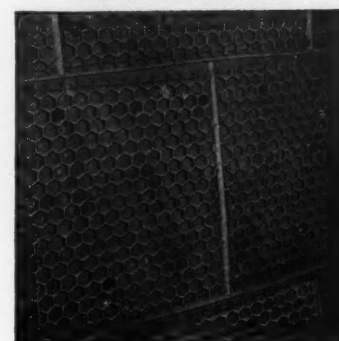
Features: A greatly increased range of accurate dispensings is possible since standard gears can be interchanged in about five minutes. Several hundred quantity adjustments can be made. A dual nozzle makes it possible to pour in two approximately equal streams at the same time. Smaller runs can be handled because drive eliminates time-consuming need for repetitive ejections when large amounts of materials are required.

Description: Gear train drive for manufacturer's pump will deliver more than 300 cc of viscous materials in a single discharge. It has dual-nozzle and solenoid control. Solenoid may be actuated by a foot control, allowing operator free use of both hands, or by a micro-switch or other mechanical or electrical impulse. It has thermostatically controlled heating up to 450°F, no-drip check nozzle, instantaneous quantity selectors with a range of 0.04 cc to 14 cc, nozzle tips as small as 1/16", and a 1 1/2 gal tank. Optional connection is provided for mother tank.

(Gear train drive is product of Edward E. Robinson, Inc., Dept. CP, 95 Park Ave., Nutley 10, N. J. . . or for more information check CP 3221 on form which is located opposite last page.)

RIGHT WHERE IT COUNTS! IRVING "GRIDSTEEL" CONTOUR RETAINER MESH

Used with
Castable Ganister Linings
in Refractionating Units
in Petroleum
& Chemical Industries



RIGHT for

- ★ Thermal Cracking Units
- ★ Cyclones
- ★ Fluid Catalytic Regenerators
- ★ Fluid Catalytic Reactors
- ★ Hydroformers & Reactors
- ★ Flue-Gas Stacks & Ducts
- ★ Catalyst-Carrying Pipe Lines

REDUCE EXPENSIVE SHUTDOWNS

by using
Irving "GRIDSTEEL",
the quality contour retainer mesh.

**IRVING SUBWAY
GRATING CO., INC.**
ESTABLISHED 1902

OFFICES and PLANTS at

5050 27th St., Long Island City 1, N. Y.
1850 10th St., Oakland 10, California

When inquiring check CP 3222
opposite last page

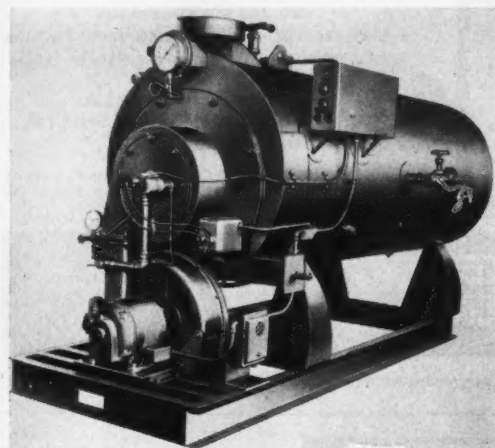
CHEMICAL PROCESSING

**Higher combustion efficiency
with secondary air damper
on 18 to 60 hp boilers . . .**

generally found only on larger size units, it gives greater accuracy in adjustment

Uses: As steam generating units in the 18 to 60 hp range.

Features: Secondary air damper now incorporated in blower housing of low hp boilers results in higher combustion efficiency.



Working pressures for boiler range from 15 to 200 psi

Description: Damper will simplify adjustment of secondary air requirements. It can be done more quickly and with a greater degree of accuracy. Entire line of manufacturer's boilers, 18 to 500 hp, is now equipped with secondary unit. Working pressures range from 15 to 200 psi.

(Cyclotherm steam generators are a product of Cyclotherm Division, National-U.S. Radiator Corp., Dept. CP, Oswego, N.Y. . . . or for more information check CP 3223 on form which is located opposite last page.)

**Applications and developments
of solenoid valves covered**

Applications, developments, and general description of large general-purpose solenoid valves are covered in two-page technical bulletin. Cutaway view and sectional drawing outline construction details. Flow characteristics curves, dimension charts, and explosion-proof enclosures available are included.

Form No. V5004 is issued by Automatic Switch Co., Dept. CP, 391 Lakeside Ave., Orange, N.J. When inquiring specify CP 3224 on form opposite last page.

NOW... a better insulating

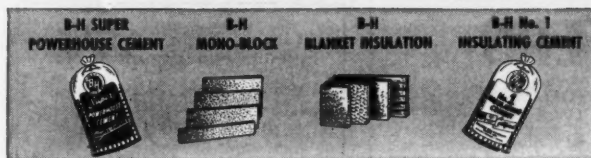
BLANKET made with
BALDWIN-HILL
Spun MINERAL WOOL



Baldwin-Hill Insulating Blankets now have lower density but greater strength due to the longer, finer mineral wool fibers produced by the NEW B-H spinning process. With the lighter weight, B-H Blankets are applied with amazing ease and speed.



Storage Tanks insulated with 1½" thick B-H Blankets having 1" wire mesh on one side; expanded metal lath on other side.



BALDWIN-HILL
COMPANY

401 Breunig Ave. Trenton 2, N. J.
Kalamazoo, Mich. Huntington, Ind. Temple, Texas

When inquiring check CP 3225 opposite last page

What are the major variables in SPRAY DRYING?

Air Flow Rate

Temperature of Effluent Air-Vapor Mixture

Temperature of Inlet Air

Residence Time of Material in Dryer

Character of Atomization

The controlled combination of inherent spray drying variables achieves the finest possible end product. Nerco-Niro engineering experience and Nerco-Niro Spray Dryers provide the proved combination for successful drying of many products, both organic and inorganic in nature.

We invite you to take advantage of our laboratory facilities at Netcong, New Jersey, where both laboratory and production sized spray drying units are available.

For more information on spray drying and its variables, write for Bulletin No. 226.

Nichols Engineering & Research Corp.

Nerco-Niro Spray Dryer Div.

70 PINE ST., NEW YORK 5, N. Y.
1637 N. Illinois St., Indianapolis 2, Ind.
1477 Sherbrooke St. W., Montreal 25, Canada



SPRAY DRYERS

used throughout the world

When inquiring check CP 3226 opposite last page

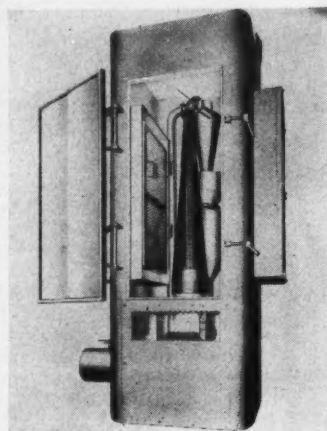
ENGINEERING

**Packaged dust collector
removes solids and
condensable fumes . . .**

capacities of 1000 to 10,000
cfm available in compact units

Uses: Provide dust free air or
air pollution control for industrial
plants.

Features: Combination of cone
and filter packs, on packaged dust
collector, remove particles of sub-
micron size and undesirable con-
densable elements.



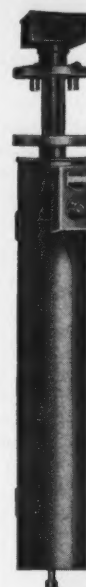
Combination of cone and fiber
filter packs removes particles of
submicron size

Description: Capacities are avail-
able ranging from 1000 to 10,000
cfm of free air. Units are compact,
varying in size from 3 x 3 x 7' for
1000 cfm to 5'6" x 5'6" x 14' for
10,000 cfm. Power requirements
range from 1½ to 15 hp and
motor is assembled with unit.

(Aerodyne dust collector is a prod-
uct of Green Fuel Economizer Co.,
Dept. CP, Beacon, N. Y. . . or
for more information check CP
3227 on form which is located
opposite last page.)

Estimate capacity of circular
storage tanks with nomo-
graph on page 166

OIL HEATING - AT YOUR VELOCITY REQUIREMENTS



TRENT "PACKAGED" CIRCULATION HEATERS

The unique design of TRENT "Packaged" Circulation Heaters eliminates return bends in the heating tubes . . . to assure free, uninterrupted flow of liquid through the heater—at the exact velocity you require! This means faster, more efficient heating of oil and water for tanks, kettles, fuel oil lines, heat exchangers and all types of process equipment. And because a TRENT "Packaged" Circulation Heater is a complete unit ready for installation you save on initial costs . . . reduce ultimate operating and maintenance costs.

TRENT SOH Oil Circulation Heater

TRENT SWH Water Circulation Heater

furnished fully equipped with

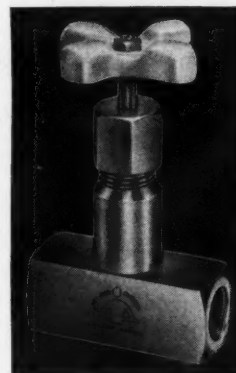
- All-Welded Companion Pipe Assemblies with Insulation
- Indicating or Non-Indicating Thermostats for Temperatures to 550°F.
- Rugged Outer Casings with Mounting Tabs
- TRENT Multi-Tube Flanged Immersion Heater Unit
- Mounted 6" square Terminal Box

Let a TRENT engineer determine the TRENT "Packaged" Circulation Heater best suited for your operations . . . or custom-engineer one to meet your special wattage and voltage requirements.



Electrically Heated Industrial Equipment
242 LEVERINGTON AVE., PHILA. 27, PA.
In Canada: Superior Power Supply Limited, Toronto, Ont.

When inquiring check CP 3228 opposite last page

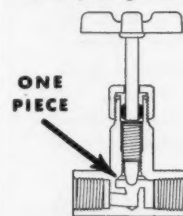


New
MARSH
Needle Valves

MAXIMUM
WORKING PRESSURE
10,000 PSI

. . . for finer regulation of water, oil or gas

First needle valve to combine all the characteristics called for in modern industry. Embodies sturdiest basic construction—machined from solid bar stock—suitable for pressures to 10,000 psi and equally efficient in lower range. Note stem guide fused to body by new "Conoweld" process, eliminating faults of conventional two-piece valves. Stem 416 stainless steel. Stem threads fine pitch for strength and micrometer regulation. Body electro-zinc plated. Sizes ½" to 1", globe and angle patterns.



Ask for new Needle Valve Catalog

MARSH INSTRUMENT CO. Sales Affiliate of Jas. P. Marsh Corp. Dpt. Z, Skokie, Ill.
Marsh Instrument & Valve Co. (Canada) Ltd., 8407 103rd Street, Edmonton, Alberta, Canada

When inquiring check CP 3229 opposite last page

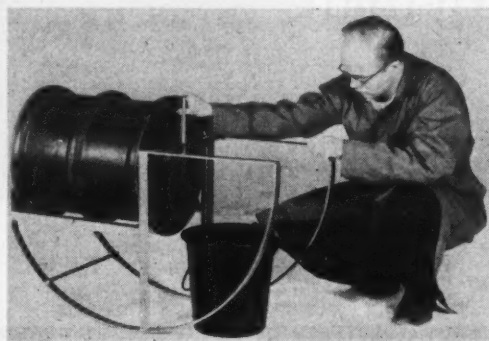
CHEMICAL PROCESSING

**Saves time, effort in pouring
solvents and chemicals
from rubber drums . . .**

tilter is light weight, portable, and eliminates spillage and waste

Uses: Handling of rubber drums containing chemicals or solvents.

Features: Large radius rockers provide smooth positive leverage to allow safer, quicker pouring from rubber drums. Unit can be loaded quickly through kick bar and beveled nose.



Tilter gives controlled pouring from rubber drums

Description: Tilter is light weight, approximately 38 lb. It eliminates spillage and waste by giving positive control over pouring speed. Standard unit fits 13 gallon capacity drums but other sizes can be furnished.

(Figure 522 drum tilter is a product of Nutting Truck and Caster Co., Dept. CP, 1201 W. Division St., Faribault, Minn. . . . or for more information check CP 3230 on form opposite last page.)

**Solutions to pumping problems
at atomic power plants**

Sixteen-page technical report tells variety of pumping units built by manufacturer to meet the various operating demands for nuclear reactors at different projects and for the atomic submarine. Units able to withstand pressures up to 5000 psi at temperatures up to 1200°F for handling radioactive water, liquid sodium, heavy water, bismuth, and radioactive slurry have been built. Each of several different types of pumps constructed is illustrated and described.

"Centrifugal Circulating Pumps and Auxiliary Pumps for Atomic Power Plants" is issued by Pump Div., Byron Jackson Co., PO Box 2017, Terminal Annex, Los Angeles 54, Calif. When inquiring specify CP 3231 on form which is located opposite last page.



Where product purity is at stake...

(as in processing color-sensitive plastics
for products like these)

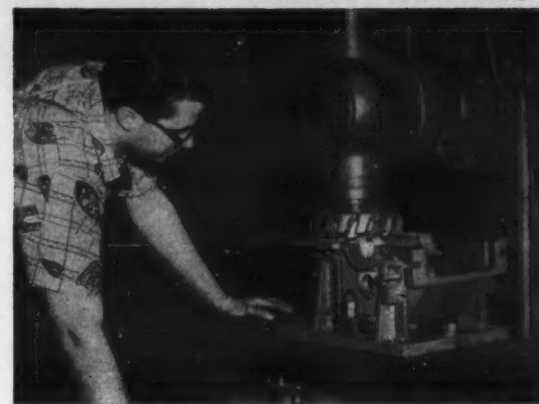
**...you can rely on
Inco-Cast Nickel**

(Here, for example, Pulva Corporation is assembling another nickel PULVA-SIZER for processing saran. Previous units, generally operated on a 24-hour-a-day basis, have proved so reliable they have given more than a year of trouble-free service. Twelve Inco-Cast Nickel castings and five other Nickel parts are used in the assembly.

In Inco-Cast Nickel you get both an enduring metal and a sound casting. That's why Inco-Cast Nickel is so useful in an application like this.

In Inco Nickel, you get a metal that will handle polyvinylidene chloride and its copolymers as well as other organics without staining them . . . a metal that doesn't tend to catalyze their decomposition at processing temperatures.

Furthermore, Inco Nickel is a tough, easy-to-machine metal with good all-around physical and mechanical properties . . . strength, corrosion resistance, wear resistance, good appearance. You can weld it readily by any of the standard welding processes using Inco welding materials.



where you need a tough casting...

(for intricate parts like the saran pulverizer housing
being milled above)



Inco Nickel — cast by Inco — is your assurance of nickel castings that are sound, free of distortion, close as to tolerance, clean as a whistle, and produced in any practical size and shape.

You can be sure, too, of Inco's extra interest in and experience with its own metals . . . and of Inco's technical assistance.

So where product purity is at stake and you need a metal you can count on to last, put Inco-Cast Nickel high on your list. For complete information, write for Inco's new booklet, "Cast to Outlast."

The International Nickel Company, Inc.
67 Wall Street
New York 5, N. Y.

Inco Castings . . . Sand, Centrifugal and Precision



When inquiring check CP 3232 opposite last page

"With our
Abbe Dispersall Mixer
we have reduced our
labor cost and get
a much finer paste"

We are using our Abbe Dispersall Mixer in the manufacture of heavy pastes, and find that we have reduced our labor cost and get a faster mix by using this piece of equipment over the old type of equipment which we were using. In the old mixers we could mix only 300 lbs. at a batch, whereas with the Abbe Mixer we can mix 900 lbs. at a batch.

We purchased this piece of equipment complete with vacuum pump, and we find that we get a very much finer paste due to the fact that mixing under vacuum, we do not mix in a lot of air bubbles.

Yours very truly,

COMPANY



Abbé Dispersall Mixer in the manufacture of heavy pastes mentioned above.

ABBÉ ENGINEERING COMPANY

50 Church Street • New York 7, N. Y.

Address Department 46

When inquiring check CP 3233 opposite last page

ENGINEERING

**Solder job possible
on hard-to-clean
metal surfaces . . .**

flux containing solder applies like butter

Uses: Soldering all metals except aluminum.

Features: Dual action, which cleans metal and lowers surface tension of solder, permits a solder job where it is impossible to adequately clean metal.

Description: Material contains flux which cleans dirt and suspends surface oxide. Solder particles are suspended in envelope of flux which lowers surface tension of solder and metal to which it is applied. Particles uniformly coat metal and will cover double area possible with standard method of applying flux and adding solder.

Material applies like butter and works on all metals except aluminum. It is packaged in two pound cans.

(Fastin is a product of Farrelloy Co., Dept. CP, 1260 North 26th St., Philadelphia 21, Pa. . . or for more information check CP 3234 on form which is located opposite last page.)

Investment castings — latest data

Steps involved in investment casting and the wide range of intricate parts that may be mass produced by the method are outlined in brochure of 12 pages. An up-to-date table on representative properties of investment cast alloys covers the center pages of the book. Carbon and low-alloy steel, martensitic stainless steel, austenitic stainless steels, and high-strength-high-temperature alloys are covered.

"Design with Microcast in Mind" is issued by Austenal Laboratories, Inc., Dept. CP, 224 E. 39 St., New York 16, N.Y. When inquiring check CP 3235 on convenient Reader Service slip which is located opposite last page.

3 WAYS SPERRY CUSTOM FILTRATION ... HELPS YOU!



Experience — SPERRY OFFERS YOU the knowledge gained thru 88 years designing and constructing thousands of filter presses for hundreds of industries.

Equipment — SPERRY OFFERS YOU a complete selection of the finest filter presses, standard or special, all types and sizes of filter media . . . plus the widest selection of closing devices and other time-savers—for all types of industrial filtration.

Engineering — SPERRY OFFERS YOU free consultation. Our laboratory and engineering departments are always at your disposal for information regarding your filtration problems . . . without cost or obligation.

Write for Free 44 page Catalog today

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Texas Chemical Engr. Co., 4101 San Jacinto, Houston 4, Texas



When inquiring check CP 3236 opposite last page

J. E. SIRRINE CO.
GREENVILLE • SOUTH CAROLINA

Engineers
ESTABLISHED 1902



PLANT DESIGN & SURVEYS • CHEMICAL • ELECTROCHEMICAL •
METALLURGICAL PRODUCTION • TRADE WASTE DISPOSAL •
WATER SUPPLY & TREATMENT • ANALYSES & REPORTS

When inquiring check CP 3237 opposite last page

CHEMICAL PROCESSING

**More compact brake motor
allows quick stops,
positive holding . . .**

magnetic disc brake used will set and hold in event of power failure or low voltage

Uses: Drive applications where positive braking action is required.

Features: Brake motor is built to meet NEMA specifications, gives more horsepower in less space. It provides quick stops and positive holding with direct-acting magnetic disc brake.



Motor has through shaft extension for cranks, tachometers, or other accessories

Description: Mechanical spring action will set and hold brake in event of power failure or low voltage. Through shaft extension is provided for hand cranks, tachometers, or other accessories. Frame is cast iron, heat seasoned to prevent warpage. Units are rated from 1 to 30 hp and are available with standard, undersize, or oversize brakes.

(Unclosed brake motors are a product of U.S. Electrical Motors Inc., Dept. CP, Box 2058 Terminal Annex, Los Angeles 54, Calif. . . or for more information check CP 3238 opposite last page.)



"I don't care how long you have to grind it— get the lumps out of that slurry!!"

How RAYMOND Flash Drying Simplifies THE PRODUCTION OF Rubarite*

*A rubberizing material for
asphalts, made by Rub-
arite, Inc., 141 W. Jack-
son Blvd., Chicago 4, Ill.

**A SINGLE CONTINUOUS
AUTOMATIC PROCESS
THAT COMBINES—**

- drying
- pulverizing
- classifying
- cooling and
- collecting

IN ONE SIMULTANEOUS OPERATION

Flow sheet showing the operating arrange-
ment of Raymond Imp Mill with Flash
Drying and Cooling System for removal
of moisture while pulverizing.

TYPICAL PRODUCTS handled by Raymond Flash Drying

PIGMENTS CHEMICALS
INDUSTRIAL WASTES
FOODS CLAYS
FILTER-PRESS PRODUCTS
SYNTHETIC RESINS
AND VARIOUS
HEAT-SENSITIVE MATERIALS

If you have a drying-grinding
problem on some similar prod-
uct — write for recommenda-
tions of Raymond engineers.

THE preparation of this modern synthetic material in-
volves delicate handling and close control throughout the
process. This was successfully accomplished with the
Raymond Flash Drying System since it delivers the finished
material in such form that the Rubarite can be easily added
to asphaltic hot mixes, so as to disperse rapidly when in-
corporated in the bitumens, and to retain all of its prop-
erties for improving the physical characteristics of asphalt
and tar.

During the pulverizing operation, the heated air passing
through the mill system effectively removes the moisture,
reducing the content from an initial 40% to a final 1%
without detriment to the product. At the same time, the
material was classified to a uniform powder of required
80-mesh fineness and then air-conveyed to the collector
system for cooling and bagging.

The Raymond Flash Drying Mill provides a clean, auto-
matic, dustless system that delivers a consistently uniform
product at a record low cost.

COMBUSTION ENGINEERING, INC.

Raymond Division

1317 NORTH BRANCH ST.
CHICAGO 22, ILLINOIS

SALES OFFICES IN
PRINCIPAL CITIES

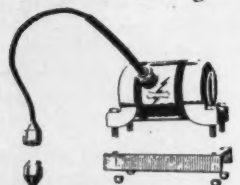
When inquiring check CP 3239 opposite last page

VIBRATOR NOISE



The racket caused by conventional electric vibrators can drive a man out of his mind. So why torture yourself and your employees . . . solve the problem with the new **silent Cleveland Electric Vibrators.**

These new vibrators operate on the eccentric-weight principal—they make no more noise than an electric motor. For detailed information, write for our new Electric Vibrator Catalog.



Pneumatic and electric vibrators for your every need.



2706 Clinton Ave. • Cleveland 13, Ohio

When inquiring check CP 3240 opposite last page

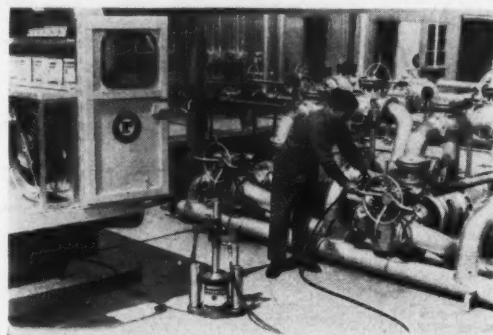
ENGINEERING & MAINTENANCE

Self-priming and lightweight lubricating gun reduces handling of lubricant

Uses: Large scale valve lubrication in refineries, compressor stations, cycling plants, pipelines, and Christmas tree installations.

Features: Specially designed air motor and double piston construction provide self-priming action. Five-quart lubricant cans are loaded directly into gun, eliminating manual changing of lubricant between cans.

Description: Gun weighs 39 lb and operates on air pressures up to 150 psi. Unit has plug valve



Five-quart lubricant cans are loaded directly into gun

operation and is designed to meet field and plant maintenance needs.

(Hypregun is a product of Meter and Valve Div., Rockwell Manufacturing Co., Dept. CP, 400 North Lexington Ave., Pittsburgh 8, Pa. . . or for more information check CP 3241 on form which is located opposite last page.)

Valuable tips on piping motion given in ball joint booklet

Section of 20-page, two-color booklet covering flexible ball joints lists valuable tips on solving piping problems involving expansion-contraction, alignment, flexing motion, and very slow rotation. Also included are installation "Do's" and "Don'ts" together with maintenance and repair instructions. Catalog covers manufacturer's line of screwed, flanged, and welding end joints; insulated and jacketed joints for liquids that solidify unless heated; flexible ball joints for working pressures to 4500 psi and temperatures to 1000°F. Complete engineering specifications are included.

Cat 215-B is available from Barco Manufacturing Co., Dept. CP, 500-530 N. Hough St., Barrington, Ill. When inquiring specify CP 3242 on form opposite last page.

WIRE MESH

Since
1880

Jelliff

Specializing in the non-ferrous metals in counts to 200 x 200 or 50 x 750 and widths up to 48" in all commercial weaves

IN MESH WITH INDUSTRY

address your enquiries to Department 27

THE C. O. JELLIFF MFG. CORP.
SOUTHPORT • CONNECTICUT • USA



When inquiring check CP 3243 opposite last page

For liquid-handling

too costly by ordinary methods

NEPTUNE CHEMICAL PROPORTIONING PUMPS

Serving many industries . . . Chemicals
• Paints • Petroleum • Water • Paper
• Sewage • Pharmaceuticals • Foods

NEPTUNE MODEL 100 Proportioning Pump for 12 gph capacity. Helps eliminate costly corrosive problems . . . piston, valves and trim are 316 stainless steel. Controlled feeding.

NEPTUNE MODEL 300 for pressures up to 1500 psi and quantities up to 30 gph. All Neptune Pumps can be furnished in special alloys to your specifications.

NEPTUNE CHEMICAL FEED UNIT is available with any Neptune Proportioning Pump. Tank agitator and pump are combined as an efficiency unit. LIGHT AND HEAVY-DUTY SUMP PUMPS, with explosion-proof motors, are available in various lengths and of special stainless steel alloys.

For details, write for Bulletin 100 PB



NEPTUNE Pumps

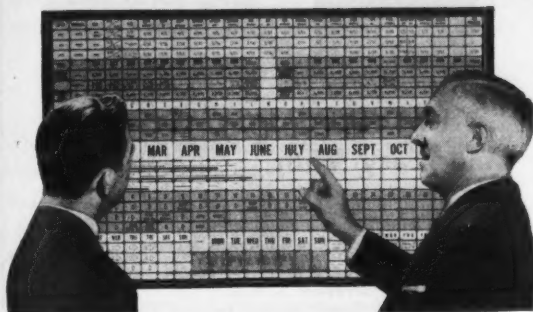
NEPTUNE PUMP MANUFACTURING CO.
4912 NORTH 6th STREET • PHILADELPHIA 20, PA.

CHEMICAL PROPORTIONING PUMPS AND SUMP PUMPS

When inquiring check CP 3244 opposite last page

CHEMICAL PROCESSING

You Get Things Done Better By Seeing What's Happening



BOARDMASTER VISUAL CONTROL

- ★ Gives Graphic Picture of Your Operations in Color.
- ★ Easy to Use. Type or Write on Cards, Snap on Board.
- ★ Facts at a Glance — Saves Time and Prevents Errors.
- ★ Ideal for Production, Scheduling, Sales, Inventory, Etc.
- ★ A Simple, Flexible Tool — Easily Adapted to Your Needs.
- ★ Compact, Attractive, Made of Metal. 60,000 in Use.

Complete Price **\$49.50** Including Cards

FREE

24-Page ILLUSTRATED BOOKLET AA-10
Without Obligation

GRAPHIC SYSTEMS, 55 West 42nd St., New York 36, N.Y.

When inquiring check CP 3245 opposite last page

NO MATTER WHAT YOUR LEAKING JOINT PROBLEMS ARE



**IT MAY PAY YOU
TO TRY LEAK LOCK
LIKE OTHER
MAINTENANCE MEN
HAVE DONE**

Leak Lock clings in tough films
that stretch rather than break

For 5 years, Leak Lock has been surprising skeptical people who didn't expect to find a "barrier" for an "impossible-to-hold" material. They were surprised at the broad scope of its capabilities.

Leak Lock is being ordered regularly by a well-diversified list of important concerns who regard it as a "find" for special uses.

Send for information and a sample. And here's a tip: Don't depend on a lab. test. Try it on the actual job. and then you will know.

Leak Lock

STEWART INDUSTRIES, INC.
(FORMERLY HIGHSIDE CHEMICALS CO.)
16 COLFAX AVENUE CLIFTON, N. J.

When inquiring check CP 3246 opposite last page

ENGINEERING

Laminates Pliofilm to aluminum foil . . .

solution adhesive can be handled on standard equipment

Uses: An adhesive for laminating Pliofilm to aluminum foil.

Features: Solution adhesive can be handled on standard laminating adhesive equipment. It forms a bond having excellent aging characteristics and good resistance to separation during heat sealing.

Description: Material is a solvent base solution adhesive. It develops heat and water resistance, has flexibility at low temperatures, and film clarity. Solids content is 38%. Application rate is three lb/ream of foil. While designed for Pliofilm and aluminum foil, adhesive develops strong bonds between Mylar and saran; treated polyethylene and cellophane; and Mylar and aluminum foil. It is available in colors or pigmented white.

(Arcco C574 is a product of American Resinous Chemicals Corp., Dept. CP, 103 Foster St., Peabody, Mass. It can also be obtained from company's sub., Reslac Chemicals Inc., 3634 W 38th St., Chicago 32, Ill. . . . or for more information check CP 3247 on form opposite last page.)

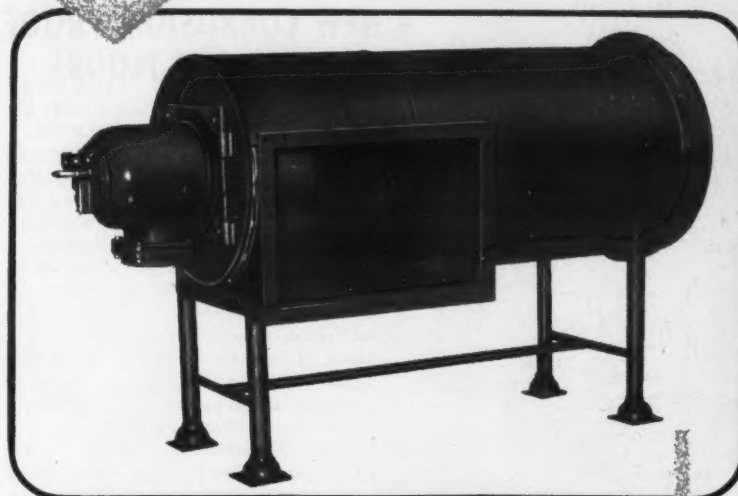
Heavy-duty power take-off handles high horsepower . . .

operates in 1800 rpm range

Heavy-duty friction power take-off is designed for engines in the 350 to 375 hp class, operating in the 1800 rpm range. Pilot bearing is composed of a single row of balls operating in bearing races of double-row width. Other features include over-size shaft and counter balanced engaging linkage. Take-off has triple drive-plate construction.

(Friction power take-off is a product of Twin Disc Clutch Co., Dept. CP, Racine, Wisconsin . . . or for more information check CP 3248 on form opposite last page.)

THERMAL TYPE CA DIRECT FIRED AIR HEATERS



COMPACT . . . EASILY INSTALLED

Readily fitted to ovens, kilns, spray dryers, etc., the THERMAL Type CA Air Heater is an ideal source of heat where products of combustion may be mixed with the air. Oil, gas or combination firing is available without change in heater construction.

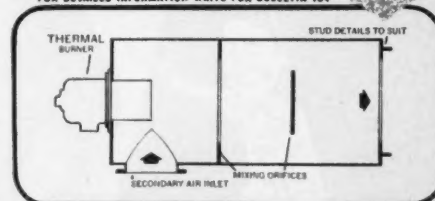
NO REFRACTORY REQUIRED . . .

The THERMAL High Velocity Burner built into the heater permits combustion to be substantially completed within the burner itself. Thus the heater is basically a mixing chamber wherein the products of combustion are mixed with the air being heated. Refractory is not normally used. Successful applications have been made ranging from under 200,000 BTU/hr. to over 20,000,000 BTU/hr. and at all pressure levels.

FOR DETAILED INFORMATION WRITE FOR BULLETIN 104

UNITIZED CONSTRUCTION

Initial cost and upkeep is kept at a minimum through the use of all welded, all metal construction. The CA Air Heaters are normally supplied as complete "package" installations.



OTHER THERMAL PRODUCTS & SERVICES

Gas, Oil & Combination Gas-Oil Burners •
Heat Exchangers • Submerged Combustion •
Combustion & Heat Transfer Engineering

T H E R M A L

Thermal Research & Engineering Corp.

CONSHOHOCKEN • PENNSYLVANIA
REPRESENTATIVES IN PRINCIPAL CITIES

When inquiring check CP 3249 opposite last page

COROCRETE

A NEW CORROSION-PROOF SURFACING FOR FLOORS

You obtain greater protection...and save dollars...when you specify COROCRETE... the new acid-proof floor material developed for diversified applications in the chemical processing, food processing, plating and metal working industries. Quickly and easily applied over existing concrete surfaces, it handles like cement topping. COROCRETE is especially resistant to solvents which destroy conventional floor surfacing materials and expose concrete under-flooring to acid attack. It can be furnished in various grades to resist virtually every type of solvent as well as most acids or alkalis. Thicknesses from 1/4-inch minimum to 1/2-inch maximum (per layer) are recommended for best results. Send coupon today to obtain a sample of COROCRETE and/or a copy of the new technical brochure shown below.

6719-CC

Resists Acids, Alkalies, Solvents

Resists Impact

Resists Abrasion

Sets up Faster Than Concrete

Costs Less Than Acid-Proof Brick

4-Times Stronger Than Concrete

MONOLITHIC CORROSION-PROOF FLOORING

get all the facts today.

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☐ Please send me a sample of COROCRETE.
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Address _____
City _____ Zone _____ State _____

ENGINEERING

Controls heat, glare,
distributes light
evenly...

louvered panel of Plexiglas
developed by Rohm & Haas

Uses: As windows providing adequate light without glare and excessive heat.

Features: Each louver of molded Plexiglas sheet combines a clear, transparent surface with an opaque surface to permit only required amount of sun's rays to pass into a room.

Description: Windows are fabricated of one piece of louvered, molded Plexiglas. They can be obtained with translucent or transparent surfaces alternating with opaque. Each panel has a flange on either side for easy weather-tight installation. Panels are non-breakable under normal conditions and are nominally available in sizes meeting standard commercial and institutional requirements. Sizes can be fabricated to fit any specifications.

(Lura-Lite louvered panels are available from Luria-Cournand, Inc., Dept. CP, Havre De Grace, Md. . . or for more information check CP 3251 on form opposite last page.)

Design of heaters shown, and services explained

Distinctive design features of Series B Multi-Pass electric heater are explained and many services to which they can be applied are pointed out in four-page bulletin. Illustrations include exterior and skeletonized views and constituent elements of heaters. Typical flow diagrams show use in hot oil system for jacketed vessels and for an asphalt plant. Complete specs are included.

Bul 102.2 is issued by Hynes Electric Heating Div., Turbine Equipment Co., Dept. CP, Mountainside, N.J. When inquiring check CP 3252 on form opposite last page.

NEW
BLASTING
GRIT

BLACK
BEAUTY

Hard Jobs Made Easy With BLACK BEAUTY BLAST GRIT

(Replaces Old Sandblast Methods)

- Gives a clean surface to resist chemical corrosion
- Different grades for any degree of etching
- No silicosis hazard
- Faster cutting
- Long-lasting—economical
- Impervious to moisture
- Clean, hard, angular grit

Free — 400 LB. WORKING SAMPLE

Write today for envelope samples and detailed product literature to help you determine the specific grade you require.

Manufactured and Distributed By

H. B. REED & COMPANY

6618-B Kennedy Ave., Hammond, Ind.

or
91-B Passaic St., Passaic, N.J.

When inquiring check CP 3253 opposite last page

AIR PURIFICATION with activated charcoal

By this means, air can be purified to remove odors and toxic substances in industrial processes, laboratories, offices, and all occupied spaces. This makes it unnecessary to ventilate with outside air which is of uncertain purity, and which must be heated in winter or cooled in summer. In this way, double benefits result from the use of activated charcoal.

Send for our free technical bulletins on Air Purification with Activated Charcoal.

BARNEBEY-CHENEY
Company
CASSADY AT EIGHTH COLUMBUS 19, OHIO

In Canada: BARNEBEY-CHENEY LTD., St. John's, Quebec

When inquiring check CP 3254 opposite last page

CHEMICAL PROCESSING

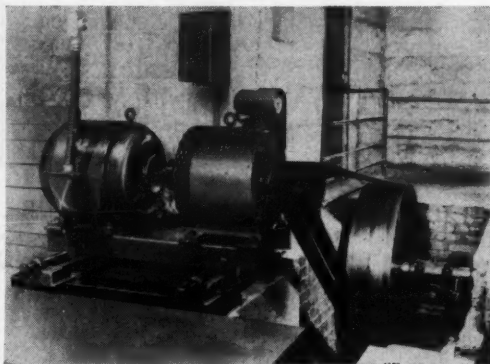
**Automatic or manual control
from zero to full speed
within two percent . . .**

adjustable speed drive changes speeds smoothly,
eliminates shocks between motor and load

Uses: Provide control of speed for fans, centrifugal pumps, and compressors.

Features: Operator can change speed by means of a knob or through automatic control devices such as combustion, pressure, or liquid-level controls. During steady-state operation load speed is kept within two percent of control setting from zero to full speed.

Description: Adjustable drive has no solid physical connection between motor and load. Power is transmitted by magnetic force between two rotating members, giving smooth speed changes and preventing transmission of shocks between motor and load.



Adjustable speed drive installation belted to giant fans which circulate air through building

Drive is air cooled and requires no external cooling system. It can be either belted or coupled to motor and load making it adaptable where space requirements are tight. Ratings range up to 95 hp for fan-type loads and up to 75 hp for constant torque loads.

(Ampli-Speed Drives are a product of Electric Machinery Mfg. Co., Dept. CP, 1331 Tyler St., N.E. Minneapolis 13, Minn. . . or for more information check CP 3255 on form opposite last page.)

**Pressure regulators provide
close pneumatic control**

Two-page bulletin describes and illustrates pneumatic pressure regulators which automatically reduce high and erratic line pressures to accurate and constant lower working pressures.

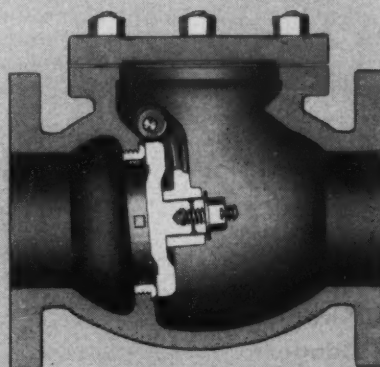
Bul 608.166.4 is issued by General Controls, Dept. CP, 801 Allen Ave., Glendale 1, Calif. When inquiring specify CP 3256, opp. last page.

Economy Buy for Many Process Services

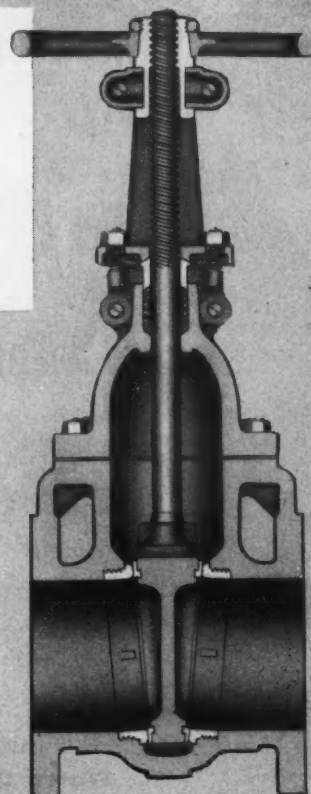
**IN PULP AND PAPER, WOOD TREATING,
CHEMICAL, PETROLEUM, ETC.**

WORKING PRESSURES: GATES AND CHECKS

12 in. and smaller—200 psi W.O.G.
14 in. and larger—150 psi W.O.G.



Cross section, Check, No. 14493
Flanged ends



Cross section, Gate, No. 14477
Flanged ends

Crane Nickel Cast Iron Valves IMMEDIATE DELIVERY from Factory Stocks

Why wait for low nickel alloy cast iron valves when you can get Crane quality—at no extra cost—immediately from factory stocks? Gates on hand in sizes: 2"—2½"—3"—4"—6"—8"—10"—12"—14"—16"—18". Checks in all the same sizes up to 12" incl. (14"—16"—18" will be made to order). This delivery offer good while present stocks last.

These valves have an outstanding record in the pulp and paper industry in handling various alkaline liquors. In wood treating they're used successfully on creosote vapors and oils. They're ideal, in the petroleum industry, for handling oils containing traces of mineral acids.

Crane 18-8 SMO alloy trim in these valves combines with nickel alloy body to assure tight seating and smooth, maintenance-free operation. The gates have Crane features such as: full-length disc guides . . . 2-piece ball-type gland . . . T-head disc-stem connection.

The checks feature all 18-8 SMO trim, including body ring, disc, hinge and hinge pin in sizes 2 to 12 inches. Valves 14 inches and larger have disc same as body, with 18-8 SMO disc faces.

You'll save with these valves on original cost and maintenance. Call a Crane Representative for immediate delivery! Crane Co., General Offices, Chicago 5. Branches and Wholesalers in all industrial areas.

CRANE Since 1855

VALVES & FITTINGS • PIPE • KITCHENS • PLUMBING • HEATING

When inquiring check CP 3257 opposite last page

no wonder tube
maintenance men
say...

WOW Water
Works



NEW

more powerful Airetool Water Driven Tube Cleaners

Always a leader, now Airetool comes to the front with newly designed, ball-bearing type tube cleaning motors that are water powered.

They are the perfect answer for plants where air and steam are not available or advisable for tube cleaning equipment... and are valuable tools in every industry where tube maintenance is a problem.

- Designed for use with either high or low pressure
- Operates on far less pressure than similar motors
- 75% more powerful than previous models
- Available in types for either straight or curved tubes, 1 1/4" to 4" I.D.

It will pay you to see an actual "on-the-job" demonstration... contact your nearest Airetool Representative, or write for literature and complete information on Airetool tube maintenance equipment best suited to your needs.

BRANCH OFFICES: New York, Chicago, Philadelphia, Tulsa, Houston, Baton Rouge

REPRESENTATIVES: In principal cities of U.S.A., Canada, Mexico, England, South America and Japan.

EUROPEAN PLANT: Airetool Nederland, N.V., Vlaardingen, The Netherlands.

- "There's an Airetool Tube Cleaner and Tube Expander for Every Type of Tubular Construction."

When inquiring check CP 3258 opposite last page



ENGINEERING

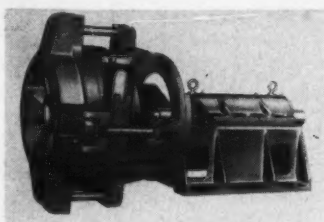
Handles abrasive slurries of solids, plant wastes, or chemical sludges...

pump's wearing parts reached without disturbing piping

Uses: Continuous duty in pumping of abrasive slurries.

Features: Heavy-duty pump will handle abrasive slurries of solids, chemical sludges, plant wastes, and other products up to maximum of fluid consistency under suction lift of positive head.

Description: Unit's stuffing box is subject to suction pressure only; wearing parts can be reached without disturbing piping; rotating ele-



Pump's discharge nozzles swivel to meet installation requirements

ment is adjustable to take up for any wear. Heavy outboard radial bearing provides extra capacity for high over-hung loads. Suction and discharge nozzles swivel to meet installation requirements. Pumps are available in seven different models from 2 to 6" size.

(Type RX slurry pump is a product of Morris Machine Co., Dept. CP, Baldwinsville, N.Y. Check CP 3259 opposite last page.)

Ductile cast iron subject of film

Properties and applications of ductile cast iron are subject of 15-minute sound, color film. Bending, twisting, impact, and tensile tests are shown. Uses in a variety of industries are illustrated.

"Ductile Cast Iron" film is available from International Nickel Company, Inc., Dept. CP, 67 Wall St., New York 5, N. Y.

IMPROVE PERFORMANCE OF DISTILLATION COLUMNS WITH AUTOMATIC REFLUX HEADS AND COLUMN REDISTRIBUTORS



AUTOMATIC
REFLUX HEAD
Pat. Pending



COLUMN REDISTRIBUTOR
Pat. No. 2,439,130

Explosion-proof, electrically-operated for high vacuum, pressure and temperature, and for corrosive and hazardous service. Eliminates reflux control problems with its simple, accurate and dependable operation.

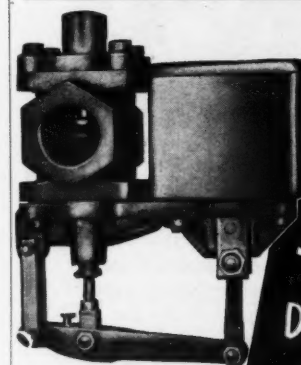
Distributes liquid evenly over the packing and minimizes channeling. Improvements of from 25% to 100% in plate efficiency are usually possible. Especially suitable for vacuum distillation. Readily installed in existing installations.

Reflux Heads and Redistributors are available in most metals and standard diameters from 2" to 36". For further information write for Bulletin No. 55-1.

**DISTILLATION
ENGINEERING COMPANY**

107 DORSA AVE.
LIVINGSTON,
NEW JERSEY

When inquiring check CP 3260 opposite last page



OUTSTANDING FOR STEAM SERVICE

JOHNSON
Direct Operated
**SOLENOID
VALVES**

**Stainless steel
valve and seat.
Sizes: 1/2" to 3".
Write for facts.**

Job after job, these Johnson Direct Acting Solenoid Valves are proving an ideal answer for service on steam lines. Their design removes the solenoid proper from the heat of the line, permits a leverage system with ample power to open against differential pressures up to 150 lbs. There are no pilot valves or auxiliary pistons, and construction is really heavy duty throughout. You will find their inherent simplicity and instant response will solve a lot of operating problems like no other valve can.



826 Wood St., Three Rivers, Mich.

When inquiring check CP 3261 opposite last page

CHEMICAL PROCESSING

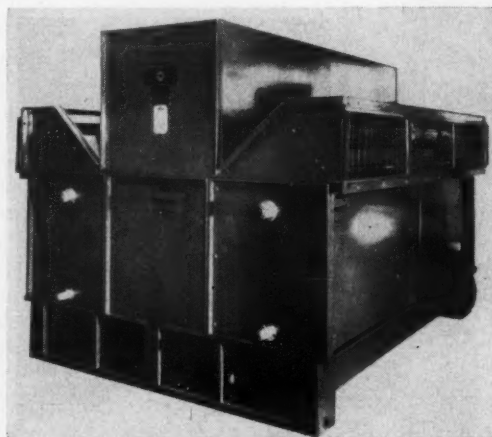
Close temperature control maintained in cooling industrial fluids . . .

variations of only 2°F possible in capacity range from 7,000,000 to 18,000,000 Btu/hr

Uses: Exchanger provides industrial cooling for fluids including water, oil, brine, gases, chemicals.

Features: Cooling by water evaporation, unit maintains close control of temperature (within 2°F). Capacities from 7,000,000 to 18,000,000 Btu/hr are available.

Description: Fluid to be cooled flows through two parallel-mounted coil sections which are continuously kept drenched with a water spray. A por-



Fluid to be cooled passes through parallel-mounted coil sections and is cooled by evaporation

tion of the water evaporates while balance is recirculated. Air travels downward through spray and enters section between coils where moisture is eliminated.

Fluid in coils is effectively cooled to a point close to atmospheric wet bulb temperature. Cooling capacity varies directly with heat input load. If heat is required spray water is heated by steam or electricity.

(Aero heat exchanger is a product of Niagara Blower Co., Dept. CP, 405 Lexington Ave., New York 17, N. Y. Check CP 3262 opposite last page.)

Stainless steel fastenings included in catalog

Among a wide variety of different types of fastenings included in 18-page catalog are those made from stainless steel. Many types and materials of construction are presented in tabular form, along with various sizes available.

Cat 455-2 is issued by The Chicago Screw Co., Dept. CP, Bellwood, Ill. When inquiring specify CP 3263 on form opposite last page.

THE CASE OF THE RECALCITRANT TUBE

FACTS: High pressure, high temperature refinery application (hydrogenation of petroleum)

Tubing in question was stainless type 347

Tubing met original specification for job

CLUES: Tubing was in service for about 100 hours at a pressure of 10,000 psi and a temperature of 1100 F, before failure.

EXAMINATION REVEALED: Temperatures and/or pressures used in actual testing or operation exceeded the original specifications

Failure resulted from progressive wall thinning due to creep

POSSIBLE SOLUTIONS: Change operating conditions
Use a thicker wall tube. Change tube material

B&W SUGGESTION: When it comes to choosing a tube, consider *every* factor involved, including possibility of exceeding current service conditions. And get the benefits of Mr. Tubes' long experience with tubing for every kind of application. He knows his tubes—what they will and what they won't do. Call him in at any time. He's as close as the phone at your elbow.

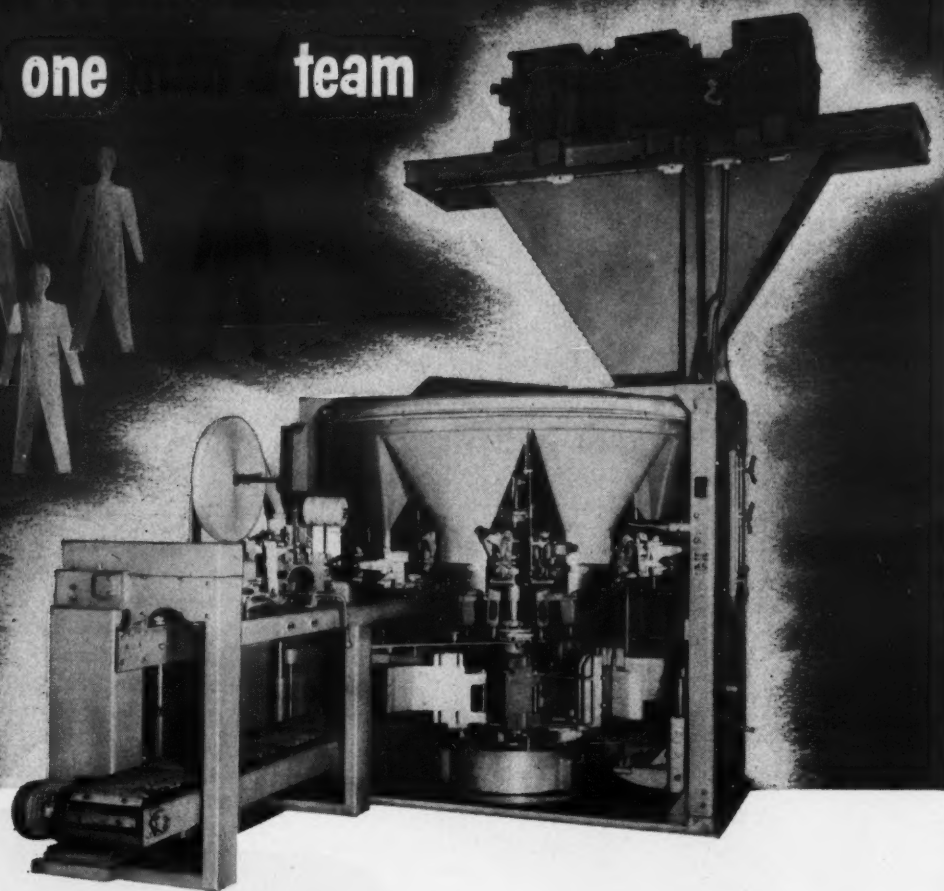


THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION, BEAVER FALLS, PA.

Seamless and Welded Tubular Products, Seamless Welding Fittings and Flanges—In Carbon, Alloy and Stainless Steels

When inquiring check CP 3264 opposite last page

one team



The Model A Bagpaker® makes large tonnage bagging of free flowing materials a one man operation — and up to 350 tons can be bagged per 8 hour shift without overtime.

All the operator does is hang the empty bags on the filling spouts. Accurate weighing, filling, settling and sewing are fully automatic.

Engineered and manufactured by Bagpak Multiwall Bag experts, the Model A Bagpaker® is designed for reliability and durability. It can be depended upon to give years of service — and to pay for itself in as little as one year. If you are interested in the utmost in economy and efficiency in packaging bulk materials, you'll want to have all the details on this efficient machine. For complete information on how the Model A can fit into your packaging picture write to:



International Paper Company, Bagpak Division
Dept. Q-17, 220 E. 42 Street, New York 17

International Paper
BAGPAK DIVISION COMPANY

BRANCH OFFICES: Atlanta • Baltimore • Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver • Des Moines • Detroit • Kansas City, Kansas • Los Angeles • Minneapolis • New Orleans • Philadelphia • St. Louis • San Francisco • IN CANADA: The Continental Paper Products, Ltd., Montreal, Ottawa, Toronto

When inquiring check CP 3265 opposite last page

ENGINEERING & MAINTENANCE

Easier pipe cleaning using sand blasting to do the job

Tool's four sizes handle any pipe or tube from ½ to 12" ID

Uses: Removing alkali deposits and salts of corrosive liquids, mill scale, carbon and coke, as well as all pitting due to erosion, from inside surfaces of pipes and tubing.

Features: Cleaning tool uses sand blast principle to remove deposits on interior surface of pipe or



Cleaning tool need not be rotated nor pipe turned

tubing efficiently and economically. A conical diverter disperses abrasive material over 360° and cleans merely by passing tool through pipe.

Description: Unit is available in four sizes which cover all sizes of pipe and tubing from ½ to 12" ID. Operation does not require specially trained personnel and can be performed in any convenient outdoor or suitably ventilated location. Unit need not be rotated nor is it necessary for pipe to be turned.

(Torno-Blast cleaning tool is available from J. C. Fennelly Co., Dept. CP, 400 Montgomery St., San Francisco, Calif. . . . or for more information check CP 3266 on form opposite last page.)

The alphabetical Product Directory (starting on page 178) will give you a page reference to all articles and advertisements in this issue

ENGINEERING

Effective up to 1800°F for insulating pipes and vessels . . .

shrinkage limited to about
1½% at top temperatures

Uses: Provides insulation for
pipes and vessels operating at tem-
peratures approaching refractory
range.

Features: Heat insulation prod-
uct withstands temperatures of
1800° F. It expands slightly up to
1100° F and shrinkage, when com-
pletely immersed in a test furnace
at 1800°F, is limited to about
1½%.

Description: Material is hy-
drous calcium silicate manufac-
tured principally from lime and
silica. It is light in weight and
can be easily cut and sawed. In-
soluble in water, it regains its
original thermal efficiency and
strength without shrinking or
warping when dried.

Pipe insulation is produced in
thicknesses and diameters for pipe
sizes from ½ to 39". Block is
made 36" long, in standard widths
up to 18", and in thicknesses up
to 3".

(Kaylo-20 insulation is avail-
able from Owens-Corning Fiber-
glas Corp., 16 E 56th St., New
York 22, N.Y. . . . or for more
information check CP 3267 on
form opposite last page.)

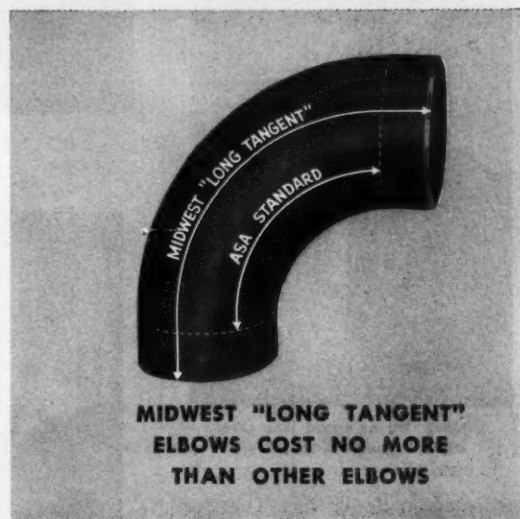
Comprehensive catalog on control valves

Wide variety of hydraulic and
pneumatic control valves are de-
scribed in eight-page catalog.
Folder No. 14 is issued by Versa
Products Company, Inc., Dept.
CP, Box 22, 249 Scholes St.,
Brooklyn, N. Y. When inquir-
ing specify CP 3268 on form
opposite last page.

For more information on prod-
uct at right, specify CP 3269
. . . see information request
blank opposite last page. ➡



THESE **MIDWEST**
"LONG TANGENT" ELBOWS
SAVED \$4121 IN PIPE



Here are 1227 Midwest "Long Tangent" Elbows (12", 14" and
16" standard weight) ready for shipment to a chemical plant. Each
Midwest "Long Tangent" Elbow has a straight section on each end
equal in length to ¼ the nominal pipe size. Thus a 12" elbow
saves 6" of 12" pipe while a 16" elbow saves 8" of 16" pipe. It
doesn't take long to save a lot of pipe and a lot of money . . . in
this instance \$4121.

But saving pipe is not the only advantage of Midwest "Long
Tangent" Elbows. They often eliminate short nipples and their extra
welds . . . save time and money in lining up and clamping pipe and
fittings . . . slip-on flanges are more easily applied. For all the facts,
write for Catalog 54.

MIDWEST PIPING COMPANY, INC.

Main Office: 1450 South Second Street, St. Louis 4, Mo.

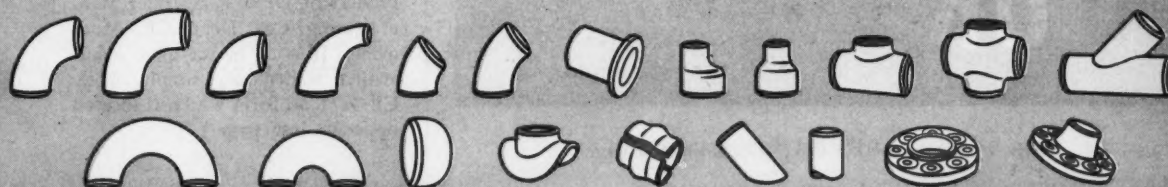
Plants: St. Louis, Passaic and Los Angeles

Sales Offices

New York 7—50 Church St. • Chicago 3—79 West Monroe St.
Boston 27—426 First St. • Los Angeles 33—520 Anderson St.
Houston 2—1213 Capitol Ave. • Tulsa 3—224 Wright Bldg.
Cleveland 14—616 St. Clair Ave. • Miami 34—2103 Le Jeune Rd.
STOCKING DISTRIBUTORS IN PRINCIPAL CITIES

MIDWEST WELDING FITTINGS

MIDWEST WELDING FITTINGS Improve Piping Design and Reduce Costs



HOKE Flow Sheet



**IT'S A
SNAP!**

... to select the small valves you need when you have Hoke's new Valve Selection Chart hanging nearby. You'll be pleased as can be with this simplified method for picking out the proper forged needle valve, bar stock valve, or spring-closing or cam-closing toggle valve from this big (18" x 24") wall chart ... They're all cataloged for you with dimensional and performance data to simplify your selection, including a Corrosion-Resistance Table for proper valve material choice and the method to be used (with formulae) for determining the proper valve size. Hoke Valve Selection Charts are now available. Just write to us, we'll be happy to fill your request.

HOKE

When inquiring check CP 3270 opposite last page

ENGINEERING

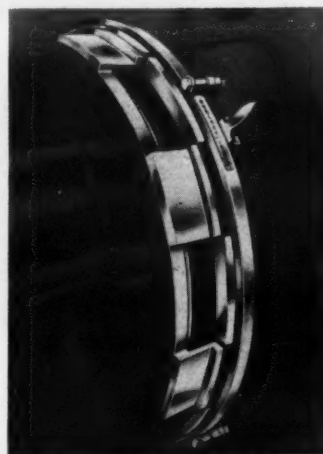
**Fast open and close
of pressure vessels
with safety cover ...**

unit needs no power devices
or hand tools to operate

Uses: Sealing pressure vessels
that require frequent opening.

Features: Cover design permits
quick easy opening and closing of
pressure vessels. Closing ring floats
in roller bearings and travels
through an arc of only 15 to 20°.
This enables cover to be opened in
seconds without use of hand tools
or power devices.

Description: Device is locked by
a series of visible bow-shaped lugs



Closing ring on speed lock cover
travels through 15 to 20° arc

mounted on closing ring. Lugs are
in direct rectangular shear, and if
one lug fails, stress divides itself
equally among remaining lugs.

Closing ring has a locking arrange-
ment in both open and closed po-
sition. Engagement of all holding
devices is simultaneous and fool-
proof. An O-ring sealing gasket
gives seal that becomes tighter in
direct proportion to increase in in-
ternal pressure.

(Passalacqua speed lock cover is a
product of Dept. P, Sparkler Man-
ufacturing Co., Dept. CP, Mun-
delein, Ill. ... or for more infor-
mation reader may simply check
CP 3271 on form which is located
opposite last page.)

GASKETS · SHIMS WASHERS

From 1 to 1 Million

No matter what type, thick-
ness, shape or quantity re-
quired, you can count on
Chicago-Wilcox for uniformly
accurate gaskets, shims,
washers or special stampings.

With 50 years accumulation
of dies, chances are we can
furnish just what you need
without a die charge—thus
reducing costs substantially
and assuring on-schedule de-
livery.

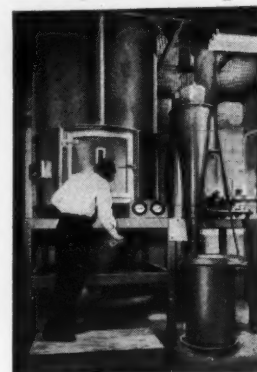
Gaskets, shims and washers
can be supplied in metallic,
non-metallic and plastics ...
teflon, nylon, etc. ... and in
quantities to meet your pro-
duction requirements.

Write for catalog and submit your
specifications for quotation.

CHICAGO-WILCOX MFG. CO.

7701 South Avalon,
Chicago 19, Illinois

When inquiring check CP 3272 opposite last page



NEW BOWEN SEMI-WORKS SPRAY DRYER

- ★ COMPACT
- ★ HIGH YIELD
- ★ EASY TO CLEAN
- ★ LOW OPERATING COSTS

● At last a fully prefabricated spray dryer requiring
only hours to erect. The new reasonably priced Bowen
Semi-Works Spray Dryer makes available a small,
compact unit requiring a working area of only 7 x 9
feet, completely prefabricated and transportable
through usual factory openings. Surfaces in contact
with the product and feed material are of stainless
steel thruout. Drying temperatures are variable be-
tween 200°F and 750°F to accomodate a wide variety
of materials.

An interesting illustrated booklet, Bulletin 36, is
available. Send for it today.

BOWEN SPRAY DRYERS
Always Offer You More!

**BOWEN
ENGINEERING
INC.**

North Branch 1, N. J.

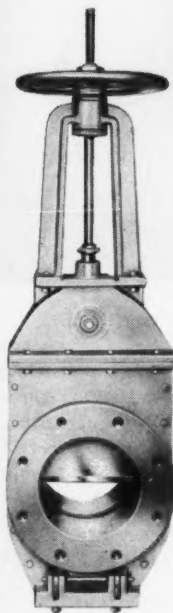
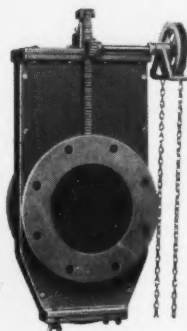
When inquiring check CP 3273 opposite last page

CHEMICAL PROCESSING

KWIKLEENS for Materials that Clog Ordinary Valves

NON-CLOGGING FULL FLOW AREA

Low Pressure
Type



Heavy Duty
Type
to 60 p.s.i.

For air, gases or liquids containing a high percentage of solids, fly ash, free-flowing granular solids or pulp stock that clog or jam ordinary valves, solve your problem with Kwikleen Slide Valves. Not necessary to disconnect from pipe line for cleaning. Made in all sizes; with manual or air cylinder operators.

W. S. ROCKWELL COMPANY



2206 ELIOT STREET
FAIRFIELD, CONN.

VALVES

Butterfly • Slide • Check
Swing Gate • Proportioning

When inquiring check CP 3274
opposite last page

JANUARY, 1956

ENGINEERING & MAINTENANCE

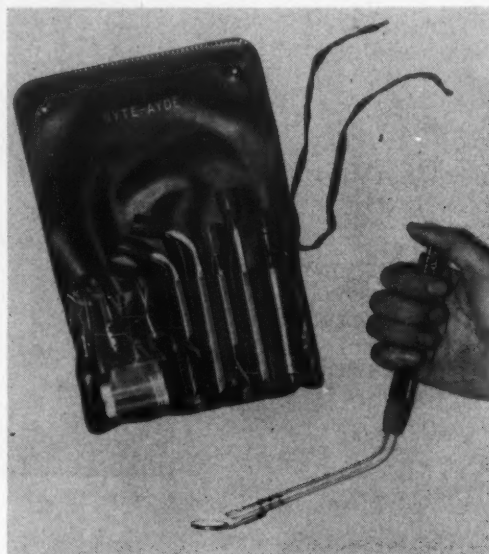
See around corners for inspection of confined areas . . .

inspection light has magnifying mirror and lucite rod for easy viewing

Uses: As a multi-purpose inspection light for close examination of hard-to-see areas.

Features: Light bends around corners by means of light-focusing rod and magnifying mirror.

Description: Pen-sized flashlight provides the light. Detachable lucite rod transmits and focuses this light on the area being inspected. Easy viewing



Pen light with accessories permits seeing around corners

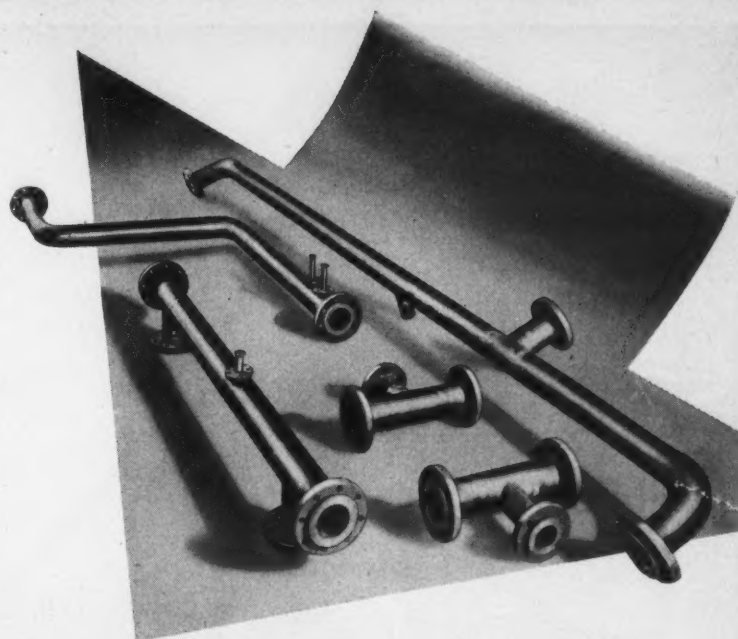
of area is possible through a magnifying mirror attached to end of rod. Four rods and three mirrors of varying length and diameters are supplied with unit.

(Syte-Ayde is a product of F.T.S. Corp., Dept. CP, 309 Vine St., Camden 2, N.J. . . for more information check CP 3275 on form opposite last page.)

Principles of forming metal parts explained

Principles of forming metal parts by expanding, shrinking, and roll forming are outlined in illustrated 20-page booklet. Company's contributions to the development of metal working machines for industry are included.

Booklet on metal forming is available on letterhead request to Dept. 28-11, Grottes Machine Works, Dept. CP, 5454 N. Wolcott Ave., Chicago 40, Ill.



Tough piping problems made easier with AMPCO* PIPE

. . . the pipe that resists corrosion and velocity damage,
withstands mechanical abuse

Put Ampco Pipe on your tough, liquid-handling jobs, and, mister, you've got something. First of all you've got pipe that's easier and less costly to install. It stands up under wrenches and hammers without thread distortion and subsequent leakage. It is readily welded with shielded arc procedures. "On-the-job" changes and maintenance may be done by the average weldor.

Pipe made from this unique aluminum-bronze alloy is hard, yet it's unusually tough — gives you Brinell hardnesses of 150 and tensiles up to 70,000 psi. It has high strength-to-weight ratios.

But here's the best part of the story. It is highly resistant to many acids and caustics. It has high velocity tolerance—permits flow rates up to 18-20 fps. It withstands the action of abrasive solids in suspension and resists cavitation-pitting. It combines the advantages of many different pipe materials without their drawbacks.

What's more, you can get Ampco Pipe in all standard sizes, many from stock. Fittings are also available to 3600 psi and flanges to 5000 psi. Write us now for full information.



Sole Producer of
Genuine Ampco Metal

AMPco METAL, INC.

Dept. CP-1, Milwaukee 46, Wisconsin

West Coast Plant
Burbank, California

*Reg. U. S. Pat. Off.

PR-15

When inquiring check CP 3276 opposite last page



Pangborn Dust Control Saves \$14,000 a year for Woodall

The Long Island plant of Woodall Industries, Inc., had a serious problem. Fabricating Masonite for its hundreds of products released so much dust that, without efficient dust control, work would be practically impossible. So Woodall installed a Pangborn Dust Control system.

The result? The dust collected not only leaves the plant dust-free but provides *all* the fuel for heating and processing requirements. Savings on fuel bills amount to \$14,000 a year! Pangborn Dust Control at Woodall pays its own way with a profit for the firm.



Pangborn can solve *your* dust problem. Pangborn engineers will be glad to show you how Pangborn Wet or Dry Dust Collectors can save you time, trouble and money!

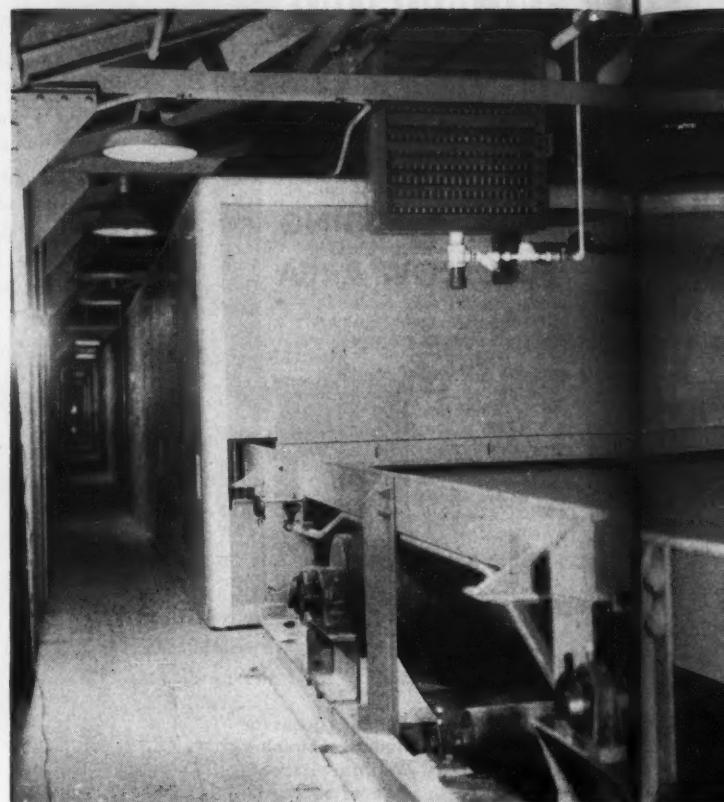
See how Pangborn benefits varied industries. Write for free copy of "Out of the Realm of Dust," Pangborn Corp., 2700 Pangborn Blvd., Hagerstown, Maryland.

Pangborn

CONTROLS DUST

When inquiring check CP 3277 opposite last page

By GORDON WEYERMULLER,
Associate Editor
with EDWARD BILLSTEIN,
Plant Engineer
Congoleum-Nairn Inc.,
Marcus Hook, Pa.



Air distribution system arrangement and automatic temp regulators on five-section conveyor dryer provide —

close control of drying

High quality of "Congoleum" enamel surface floor covering is maintained while production capacity increases five-fold with only slightly more manpower

Problem: Former dryer used at Congoleum-Nairn's Marcus Hook plant involved excessive handling of the flooring materials. This dryer, which was 65' high, employed a festoon system of suspending material to be dried on 50' high loops placed over successive rollers. In addition to being bulky and not as efficient as was desired, former method would not meet

requirements of increased production.

Solution: On Nov. 15, 1954 a five-section conveyor dryer was placed in service. Each section of this dryer is 37' long, 15' wide, and 8' high. Total length of dryer, including about 5' spaces between each section, is 213'. As flooring material is pulled through unit over rollers, it is dried by means of heated air passed through dryer.

Before the drying operation, a backing of water emulsion paint is applied to the felt base of the flooring. This coating is dried in the five-section unit. It must not be dried too dry or left too wet or paint will come off.



CP staff photo

Coated flooring material comes from 213' long conveyor dryer at Congoleum-Nairn

Outstanding feature of dryer is the air system, which consists of adjustable-pitch fans for volume control and a special arrangement of baffles and nozzles for uniform air distribution. Dryer employs ten 10-hp recirculating fans and five 3-hp units for exhaust air supply.

One recorder-controller is used for each of the five dryer sections to regulate steam input to coils

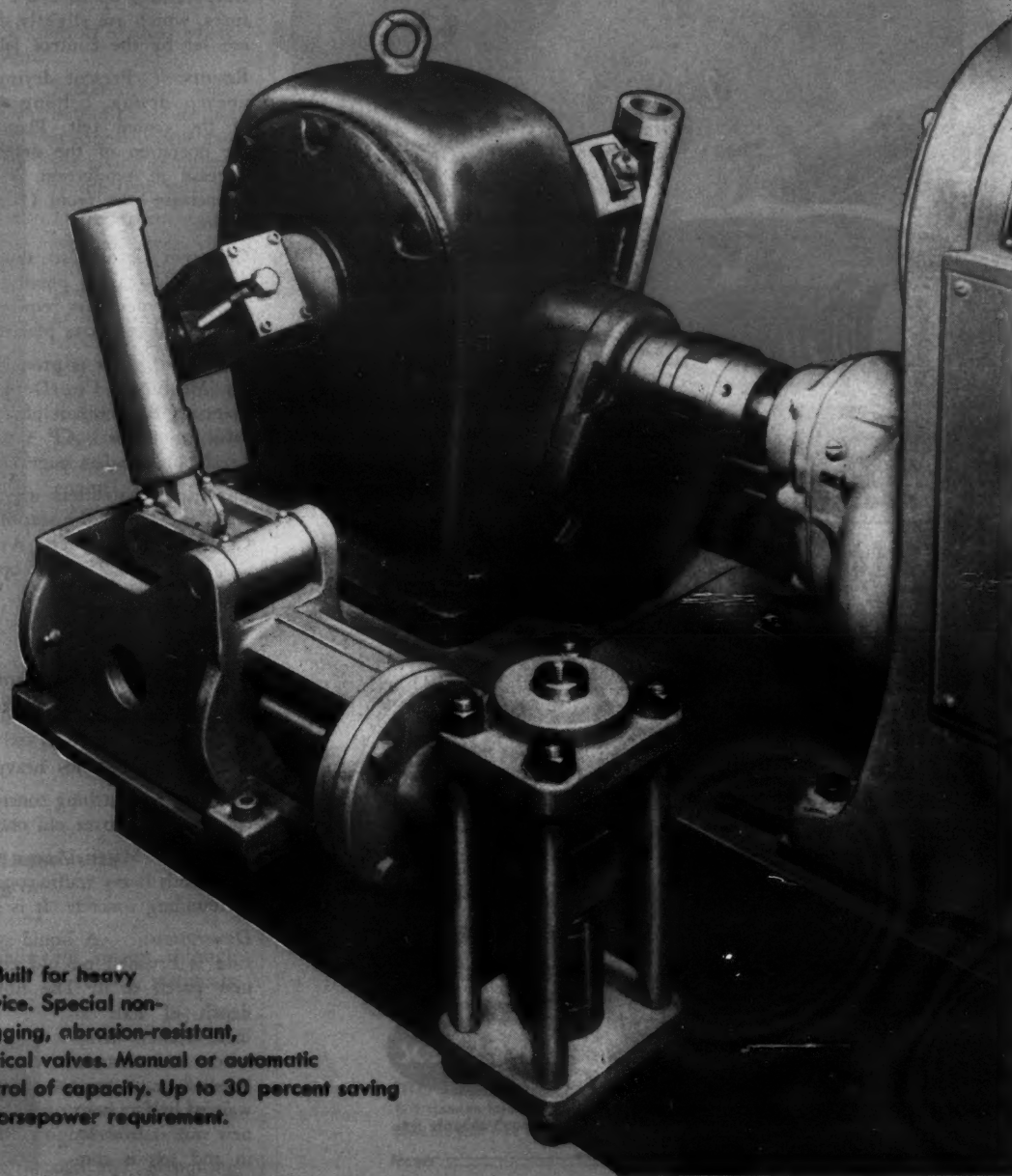
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CP staff photo
Recorder-controllers, one for each of the five dryer sections, regulate temperature closely

chemical pumps...

pressures to 50,000 psi • capacities to 15,000 gph

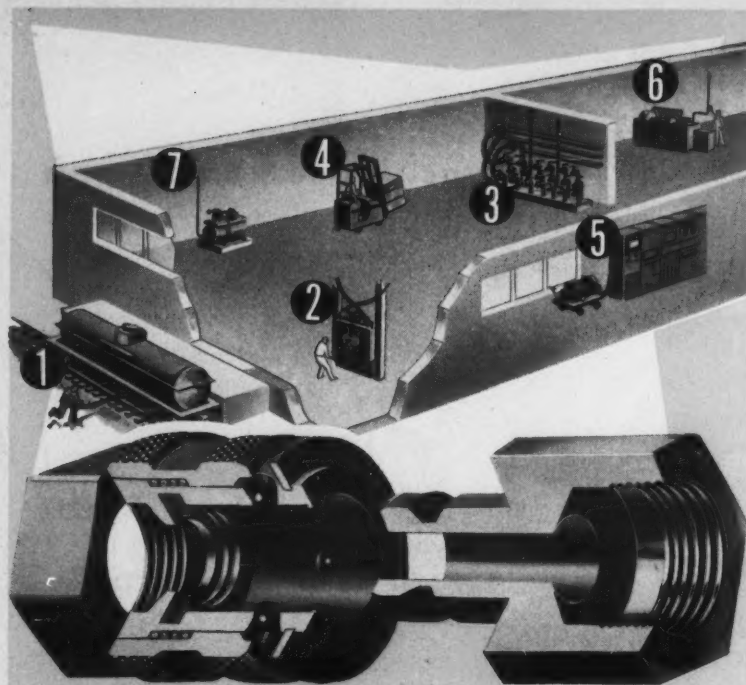


- Built for heavy service. Special non-clogging, abrasion-resistant, vertical valves. Manual or automatic control of capacity. Up to 30 percent saving in horsepower requirement.

PHILADELPHIA PUMPS

PHILADELPHIA PUMP & MACHINERY CO. / 1513 Race St., Phila., Pa. / Subsidiary of American Water Co.

When inquiring check CP 3278 opposite last page



whatever the operation...

Titeflex Quick-Seal Couplings for fast, leakproof connections!

Everywhere in industrial operations, you find Titeflex Quick-Seal Couplings "making connections"! And what connections! Absolutely leakproof. Couple or uncouple in one second. Allow free flow of any material. Sizes 1/4" to 12".

See drawing for typical uses. Then check your own plant for trouble spots where Quick-Seal Couplings can serve you profitably. For details... send coupon.

- | | |
|-------------------------------|----------------------------|
| ① Tank Car Unloading | ⑤ Mobile Testing Equipment |
| ② Furnace Doors | ⑥ Machine Cleaning |
| ③ Blending "Switchboards" | ⑦ Air Lines for Tools |
| ④ Lift Trucks—Hydraulic Lines | |

Titeflex

TITIFLEX, INC. (Industrial Products Div.)
509 Hendee Street, Springfield, Mass.

Send me your free Quick-Seal Couplings Catalog—don't obligate me.

Name _____ Title _____
Firm _____
Address _____
City _____ Zone _____ State _____

Titeflex Quick-Seal Couplings • Leakproof at all operating pressures, in every application

When inquiring check CP 3279 opposite last page

ENGINEERING & MAINTENANCE

CONVEYOR DRYER

(Continued from preceding page)

by means of control valves. A remote control bulb is located near product in each section. Dryer temperatures up to 250°F are available. Temperatures, which are slightly different in each section, are set by the control laboratory.

Results: Present drying system eliminates any uneven drying, helping to maintain the quality of the coated felt. Plant is well satisfied with the operation of the dryer. To obtain a five-fold increase in production, it will only be necessary to increase crew from 15 up to 19 men in coating section.

Conveyor dryer also saves considerable hauling around decreasing possibility of damage to product. Equipment has required a minimum of maintenance since it was placed in service.

(Conveyor dryer is product of The National Drying Machinery Co., Dept. CP, Lehigh Ave. and Hancock St., Philadelphia, Pa. . . . or for more information check CP 3280 on form which is located opposite last page.)

(Recorder-controllers are product of Brown Instrument Div., Minneapolis-Honeywell Regulator Co., Wayne & Roberts Ave., Philadelphia 44, Pa. . . . or check CP 3280A opposite last page.)

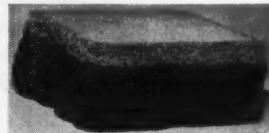
Synthetic copolymer emulsion repairs broken or cracked concrete floors...

patch withstands heavy traffic conditions

Uses: For patching concrete floors and laying new concrete floors over old ones.

Features: Material keeps patch in place indefinitely, withstands heavy traffic conditions equally as well as surrounding concrete. It is clean and simple to use.

Description: A liquid synthetic copolymer emulsion is brushed on old concrete surface to bond new patch to it. The hole is chiseled out to a depth of half an inch, cleaned, dampened, and material brushed on. After a wait of half an hour, new mix is troweled in and job is complete. For new floors, thickness should be not less than half inch and they should not be featheredged.



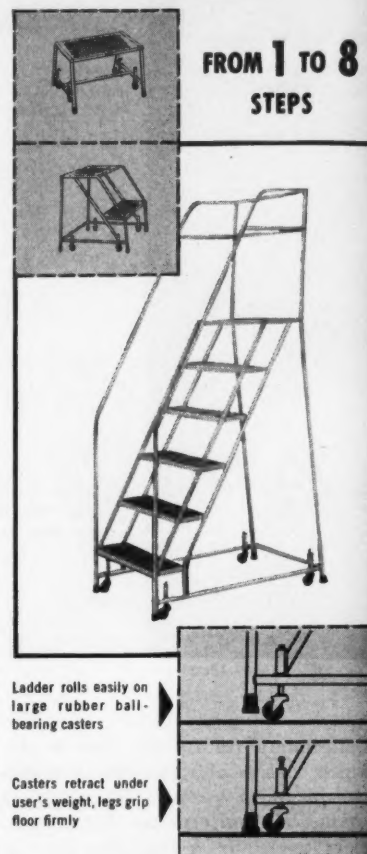
Makes a tight bond between new cement and old

(Tropical Cement Bond is a product of Tropical Paint Company, Subsidiary of Parker Rust Proof Co., Dept. CP, 1128-1130 W. 70th St., Cleveland 2, Ohio . . . or for more information check CP 3281 on form opposite last page.)

SAFE · CONVENIENT
DURABLE · LOW COST

BALLYMORE SAFETY-STEP LADDERS

FROM 1 TO 8
STEPS



Ladder rolls easily on large rubber ball-bearing casters

Castors retract under user's weight, legs grip floor firmly

Ballymore Safety-Step Ladders are available in a wide variety of sizes and models to meet working-height requirements up to 11'6". They are easily moved on rollers, but with no danger of "kick-out."

Made of all-welded 3/4" steel tubing for maximum strength. Rust-resistant aluminum coating gives a durable, attractive finish. Handrails, optional on 2- through 8-step models, help eliminate fear of accidents. Three treads available: expanded steel, grip steel lath, and rubber-clad steel plate.

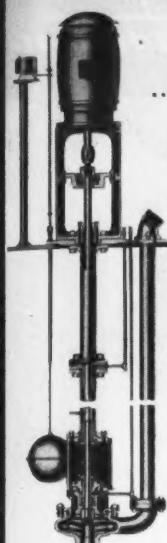
Write for specific information to Ballymore Company, Wayne 10, Pa.

**BALLYMORE
LADDERS**



When inquiring check CP 3282 opposite last page

CHEMICAL PROCESSING



... for chemical plants
processing industries
factories
utilities
power plants

the YEOMANS heavy duty vertical wet pit pump

... ideal for corrosive drainage... grit, ash, abrasives... acids and alkalies... molten nonmetals

Here's why Yeomans Heavy Duty Vertical Wet Pit Pumps are better for you!

- No priming necessary. Pump primes itself... stays primed.
- Saves space... requires only enough area for small cover.
- Easy to service. Just break pipe and electrical connections... then lift out pump assembly.
- Exclusive Lubri-Vac® lubrication system reduces main bearing failures 90-95%... increases pump life 10 to 12 times.

Ask for your copy of Catalog 3007 which gives additional information.

YEOMANS

2003-5 N. Ruby Street, Melrose Park, Ill.
... manufacturers of: centrifugal pumps •
pneumatic sewage ejectors • distributors •
clarifiers • mechanical aerators • digesters.

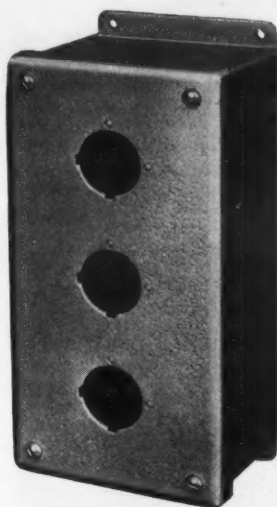
When inquiring check CP 3283
opposite last page

ENGINEERING & MAINTENANCE

Sponge neoprene gasket provides oil-tight seal on push button box

all welded construction permits lower unit cost

Uses: Enclosing electrical controls in areas where liquids and dirt are a problem.



Hinged cover is readily removable for easy wiring of control units

Features: Push button enclosure has sponge neoprene gasket giving completely oil-tight seal.

Description: All welded steel construction permits low unit price. Cover has special hinge arrangement to allow easy wiring of control units. Enclosure is fabricated from 14 gage steel and finished with a baked enamel, gray hamertone over a phosphatized surface. Units are available in ten standard sizes for from 1 to 25 control units.

(Oil-tight push button enclosures are a product of Hoffman Engineering Corp., Dept. CP, 1192 Tyler St., Anoka, Minn. . . or for more information check CP 3284 on form opposite last page.)

Converts any standard bench vise into an efficient brazing or soldering work station . . .

installed in 30 seconds, jig rotates through 360°, permits operator to remain stationary

Uses: Mounting fixture for brazing and soldering work.

Features: Jig can be mounted in any standard bench vise in 30 seconds, converting work bench into an efficient brazing-soldering work station.

Description: Unit turns through 360° permitting operator to remain stationary while work rotates. Three standard ceramic jig blocks are included. Specially shaped blocks can be designed and molded to fit unit, allowing infinite number of brazing setups.

(Roto-Jig is a product of Technion Design and Manufacturing Co., Inc., Dept. CP, 262 Mott St., New York 12, N.Y. . . or for more information check CP 3285 on form opposite last page.)



versatile, durable Titeflex metal hose . . . for every type of processing operation

Can take grueling punishment from corrosive fluids, high temperatures, excessive vibration and pressures . . . or from any combination of these industrial spoilers. All-metal construction. Wide range of sizes. Braided or unbraided. Choice of alloys and fittings to meet every need.

Titeflex Metal Hose finds many important jobs everywhere. Investigate your processing operations now and see where Titeflex Flexible Metal Hose can work for you. Send in coupon for important additional information today.

- | | |
|--------------------------|---|
| ① Fire Extinguisher | ⑤ Milling Machine |
| ② Air Control Lines | ⑥ Hydraulic Press—
Lubricating Lines |
| ③ Cleaning Vats | ⑦ Steam Lines |
| ④ Air Conditioning Units | |

TITEFLEX, INC. (Industrial Products Div.)
509 Hendee Street, Springfield, Mass.

Send me your free Titeflex Flexible Hose Catalog without obligating me.

Name _____ Title _____
Firm _____
Address _____
City _____ Zone _____ State _____

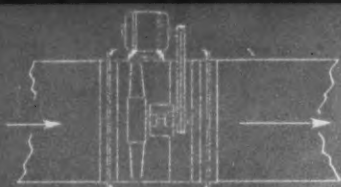
TITEFLEX FLEXIBLE METAL HOSE **licks**

corrosion
temperature
vibration
pressure

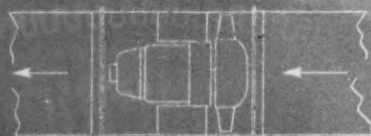
in all industrial
operations.

When inquiring check CP 3286 opposite last page

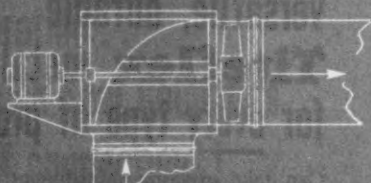
Large Volumes of Air -- with Low Power Consumption



WINGFOIL Straight-Line Duct Fan forms part of run of duct. V-belt drive through air tube. Motor on adjustable platform is outside air stream. Sizes: 21" to 60". Capacities to 95,000 CFM, pressures to 2" s.p.



WINGFOIL Vaneaxial Duct Fan. Direct connected motor inside casing. Motor is totally enclosed with sealed bearings. Sizes: 10" to 42". Capacities on application.



WINGFOIL Elbow Type Duct Fan forms elbow in duct system. Strong rectangular frame. Motor outside air stream. Direct or V-belt drive. Mount in any position. Sizes: 10" to 60". Capacities up to 85,000 CFM, pressures to 2" s.p.

WINGFOIL DUCT FANS are your best bet, because of their strong, light-weight, rugged design, and the highly-efficient Wingfoil axial flow fan, which delivers high air volumes against static pressures with remarkably low power consumption.

The three types of duct fan, shown above, come in a wide variety of sizes and capacities. They are designed to handle

hot or cold, dust-laden or corrosive air or gases and for exhausting or supplying air. Write for Bulletin. Use the coupon.

L. J. Wing Mfg. Co. 179 Vreeland Mills Road, Linden, N. J.

Factories: Linden, N. J. & Montreal, Can.

Wing

L. J. Wing Mfg. Co., Linden, N. J. CP-1
Please send me bulletin on WINGFOIL DUCT FANS.
Name.....
Firm.....
Address.....
City..... Zone..... State.....



When inquiring check CP 3287 opposite last page

ENGINEERING & MAINTENANCE

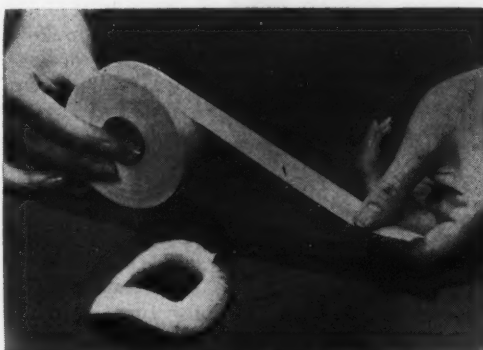
Greater varnish pickup ability, conformability, in wrapping electrical components . . .

polyester web offers increased moisture resistance for coils, transformers, and motors

Uses: Providing a base for varnish or resin impregnating of electrical components.

Features: Non-woven polyester web has approximately two and one half times varnish pickup ability of conventional wraps. Material conforms snugly to irregular surfaces without pulling apart or slipping.

Description: Wrapping is fabricated from polyester fibers. It has very low moisture absorption and high resistance to edge tear. Non-woven form allows



Wrapping conforms snugly to irregular surfaces

rapid, complete, void-free impregnation. Material, white in color, is available in calipers ranging from 6.5 to 9.5 mils, up to 36-yard lengths, and in standard widths to 44".

(Scotch brand polyester web is a product of Dept. E5-245, Minnesota Mining and Manufacturing Co., Dept. CP, 900 Fauquier St., St. Paul 6, Minn. . . or check CP 3288 opposite last page.)

Assures same expansion of tubes despite variations in size of tube or tube sheets . . .

electric control is torque limiting device designed for use with tapping motor

Uses: Maintaining even torque in tube rolling operations.

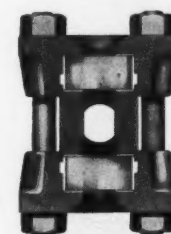
Features: Control assures same expansion of each tube, after metal-to-metal contact, regardless of small variations in size of tube and tube sheets.

Description: Unit is a torque limiting device designed for use with any standard tapping motor. Construction is sturdy, and operation is simple enough for an inexperienced man to learn with ease.

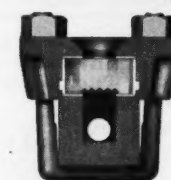
Strahman

HIGH PRESSURE GAUGES

USED IN
REFINERIES
AND
CHEMICAL PLANTS
THROUGHOUT
THE WORLD



THRU VISION



REFLEX

Single or Multiple
Sections

TUBULAR

Gauge Cocks
Large Chamber
Reflex Gauges
Heated or Cooled
Gauges

SEND FOR
COMPLETE
CATALOGUE

STRAHMAN VALVES, Inc.
16 Hudson St., New York 13, U.S.A.

When inquiring check CP 3289
opposite last page

CHEMICAL PROCESSING

Once vol
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(Four-way
Switch Co
N.J. . . .
on form

JANUA



Controller is sturdy and operation simple

Once voltage is balanced, with integral balancer, no further adjustment is needed during tube rolling operation. Unit is equipped with ten-foot service cord, a remote signal light with 25-foot expansion cord, and spare set of fuses.

(Tube expander controller is product of Elliott Co., Dept. CP, 1809 Sheridan, Jeannette, Pa. . . or for more information check CP 3290 on form which is located opposite last page.)

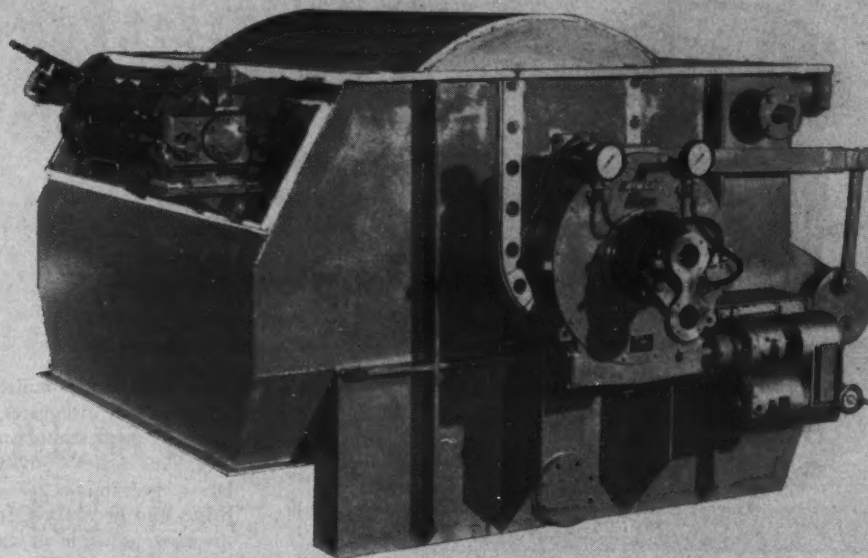
Safe and dependable control of double-acting pneumatic or hydraulic cylinders

Uses: Solenoid valves have been designed for safe and dependable control of double-acting pneumatic or hydraulic cylinders.

Features: They are fast acting — up to 850 cpm. Valve performs in air, gas, water or hydraulic fluid at 10-500 psi. They are simple and rugged in design, have corrosion-resistant bronze body. Main valve is power operated in both directions; no return springs are used.

Description: Dual and single solenoid four-way valves have poppet-type seats and discs. Combination of metal-to-metal with resilient type discs provides absolute tight seating. They are explosion-proof, and have watertight solenoid enclosures. JIC construction is also available.

(Four-way solenoid valves are products of Automatic Switch Co., Dept. CP, 391 Lakeside Ave., Orange, N.J. . . or for more information check CP 3291 on form opposite last page.)



Absolute Purity of Product Maintained with Eimco Filters

Absolute purity of product is maintained when using Eimco continuous vacuum or pressure filters. The picture above illustrates one of the many Eimco filters being used by industries that must maintain absolute purity such as antibiotics and other pharmaceuticals, food and allied industries and chemical industries.

To meet the requirements of these industries, Eimco makes all filters to specifications produced by cooperative efforts of the customer's engineering staff and Eimco's Research and Development engineers.

The filter shown above is a high submergence type filter designed for use with precoating material. The drum is all type 316 stainless steel and the tank is of mild steel with 1/4" thick PVC

lining. The lining is carried out through flanged connections and bolt-on-assemblies so that the white PVC material is visible from the outside. This filter is equipped with the Eimco Hyflow automatic valve for greatest efficiency in operation and the Eimco knife advance mechanism.

All of these features are significant to the type of application for this particular filter. Your problem receives the same detailed consideration by Eimco engineers who are specialized in filtration equipment. That is the reason Eimco filters work better, last longer, produce more and require less maintenance, square foot per square foot, than any other filter.

Write for more information on your specific problem.

THE EIMCO CORPORATION
Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N.Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Baltimore, Md. Pittsburgh, Pa. Seattle, Wash. Pasadena, Calif. Houston, Texas Vancouver, B.C. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa



B-162

When inquiring check CP 3292 opposite last page



VYFLEX *FLIGID*® lining stops sodium hypochlorite

The problem solved by lining the tank shown above with Fligid is particularly important because it is so widespread. Invaluable as an industrial bleach, sodium hypochlorite has a voracious appetite for just about every known lining or coating material. The bleach decomposes some on contact. It permeates others, raising gas blisters that force the lining away from the tank wall.

But nothing happens to *Fligid*! Sodium hypochlorite is completely powerless against this amazing new laminate of two different Polyvinyl Chloride based membranes. Furthermore, the cost of lining a tank with Fligid is negligible compared to the cost of replacing the tank.

The exposed face of *Fligid* is unplasticized PVC, able to resist the widest range of corrosives, at temperatures to 190 F in many solutions. There's no plasticizer to leach out and contaminate reagents. And this outer face is harder and more abrasion resistant than any other lining material. The inner face is resilient, flexible PVC, easily applied to steel, wood, or concrete, by simple adhesive bonding techniques with no curing. Qualified Kaykor applicators across the United States and Canada give fast, professional service applying *Fligid* to any size or shape structure in the field or in the shop.

GET THE FACTS! Write now for the complete story, including all technical data, in the just published technical sheet "*Fligid*"... free on request to Kaykor Industries, Inc., 4401 Broad Street, Yardville, New Jersey.

K KAYKOR INDUSTRIES, INC.
Division of Kaye-Tex Manufacturing Corp.
YARDVILLE, NEW JERSEY

When inquiring check CP 3293 opposite last page

new literature

Precipitated calcium carbonates

Two information bulletins on precipitated calcium carbonates, of primary interest to paint manufacturers, are available. First reviews advantages in formulating polyamide gel alkyd flat wall paints and gives three formulas. Second discusses principle of extending opaque pigments in enamels.

Bulletins on precipitated calcium carbonates are available from Silicate, Detergent, Calcium Division, Diamond Alkali Co., Dept. CP, 300 Union Commerce Bldg., Cleveland 14, Ohio. When inquiring check CP 3294 on form opposite last page.

Sorbic acid uses and properties

Physical properties, solubilities, shipping data, physiological properties, and food uses of sorbic acid are given in eight-page technical information bulletin.

Bul F-8526A is issued by Carbide and Carbon Chemicals Co., a Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring check CP 3295 on form opposite last page.

Stability of toluidine red in latex paints

Six-page pamphlet discusses effect of lecithin, a soybean derivative, on dispersion and stability of toluidine red in latex paints. Toluidine red is desirable because it retains its color, but difficulty has been found in integrating it into the paint. Kronstein, DeLong, and King authored the paper.

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services

Paper on stability of toluidine red in latex paints is available from Office of Information Services, New York University College of Engineering, Dept. CP, University Heights 53, N. Y.

Answers to corrosion pumping problems

Four-page bulletin on chemical pumps contains a description of line of mechanical shaft seals to answer almost all corrosion, pressure, temperature, and liquid-handling requirements. Fifteen pumps are covered in bulletin and descriptions given of construction and features of each.

Bul BJP-682 is issued by Pump Div., Byron Jackson Div., Borg-Warner Corp., Dept. CP, PO Box 2017, Terminal Annex, Los Angeles 54, Calif. Check CP 3296 on Reader Service slip which is located opposite last page.

Translations of German reports from IG Farben available

Two research bulletins list translations available about German manufacturing processes and research reports from file of I.G. Farbenindustrie A.G. Bulletins contain about 150 different manufacturing processes for chemical and organic intermediates. Reports are listed in alphabetical order according to name of substance to which the manufacturing process pertains.

Bul 98 "Chemical Intermediates" and Bul 112 "Organic Intermediates" are issued by Research Information Service, Dept. CP, 53 Nassau St., New York 38, N.Y. When inquiring check CP 3297 on Reader Service slip which is located opposite last page.

Handbook of hydraulic tables and other engineering data

Reference work for hydraulic engineers contains hydraulic tables and other engineering data to help solve pumping and piping problems. Two-color, 28-page booklet contains such information as friction loss for water in feet per one hundred feet of pipe, steel pipe data, ram speed and flow chart for pipe lines, friction losses through screw pipe fittings, and theoretical discharge of nozzles. Saturated and superheated steam tables and suggested materials for pumping various liquids are included.

Bul 50 is available from The Aldrich Pump Company, Dept. CP, 25 Pine St., Allentown, Pa. When inquiring specify CP 3298 on the convenient Reader Service slip which is located opposite last page.

Lists ethylene oxide derivatives of fatty acids, amines, amides

Comprehensive discussion of ethylene oxide derivatives of fatty acids, fatty amines, and fatty amides is given in 26-page, two-color booklet. Designed to acquaint chemists and formulators with etho-chemicals, it reviews the diversity of these surface active agents. Physical properties, emulsifier tables, industrial applications, and chemical properties are included. Four-page, two-color foldout section lists complete solubility characteristics.

"Armour Etho-chemicals" is available from Derivatives Dept., Armour Chemicals Div., Armour and Co., Dept. CP, 1355 W. 31st St., Chicago 9, Ill. When inquiring specify CP 3299 on the convenient Reader Service slip which is located opposite last page.

Shows test equipment for maintenance

Catalog of 16 pages illustrates and describes complete line of test equipment available from manufacturer for servicing industrial electronic and electrical equipment. Test equipment described includes AC clamp ammeter, circuit tester and analyzers, electron tube analyzers, oscilloscopes, pocket-sized milliammeters and ohmmeters. Each unit is illustrated and described, including features, specifications and typical applications.

Catalog R-36-A is issued by Weston Electrical Instrument Corp., Dept. CP, 614 Frelinghuysen Ave., Newark 5, N. J. When inquiring specify CP 3300 on the convenient Reader Service slip which is located opposite last page.



New Alcoa book tells how, where, why to use Aluminum Pipe and Fittings

ALCOA Aluminum Pipe is being used in more applications—solving more and more problems than ever before. That's because ALCOA Aluminum Pipe offers three important advantages: (1) Its low price makes it the least expensive material to use for special-purpose piping; (2) Its lightness makes it ideally suited for quick, economical installation; (3) Its durability keeps maintenance and replacement costs at rock bottom.

The complete story is in this new ALCOA book. Filled with useful illustrations and charts, it gives all the facts on the latest uses of ALCOA Aluminum Pipe and Fittings for:

PROCESS PIPING APPLICATIONS for carrying fluids in chemical and petroleum plants, food processing plants, and many others.

PIPELINE APPLICATIONS for carrying oil and gas; for mine drainage and similar applications.

PORTABLE PIPING APPLICATIONS for supply or disposal lines that handle water, steam, compressed air, fuel and other commodities in such operations as construction, oil well drilling and mining.

STRUCTURAL PIPING APPLICATIONS for use as railings, fence posts, playground equipment, storage racks and scaffolds, and other outdoor uses.

All this plus detailed information on fittings and flanges, valves, installation procedures, and eight helpful tables to aid you in selecting the *right* ALCOA Aluminum Pipe for your need.

Write today for your free copy. Use the coupon.



Aluminum Company of America
902-A Alcoa Building
Pittsburgh 19, Pennsylvania

Please send me your new, FREE booklet, *Aluminum Pipe and Fittings*.

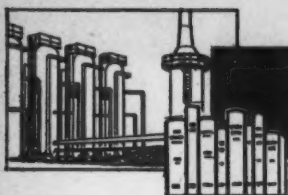
Name _____

Company _____

Address _____

City _____ Zone _____ State _____

When inquiring check CP 3301 opposite last page



Solubilities of Hydrocarbons in Water

By DANA S. DAVIS
Miami University, Oxford, Ohio
Edited by DALE S. DAVIS
Professor of Chemical Engineering
Virginia Polytechnic Institute

This line coordinate chart, a product of simple geometric methods¹, enhances the value of data obtained by Griswold and Kasch². It allows rapid estimation of solubility of hydrocarbons in water based on the equation

$$S = 10^{a + bt}$$

where —

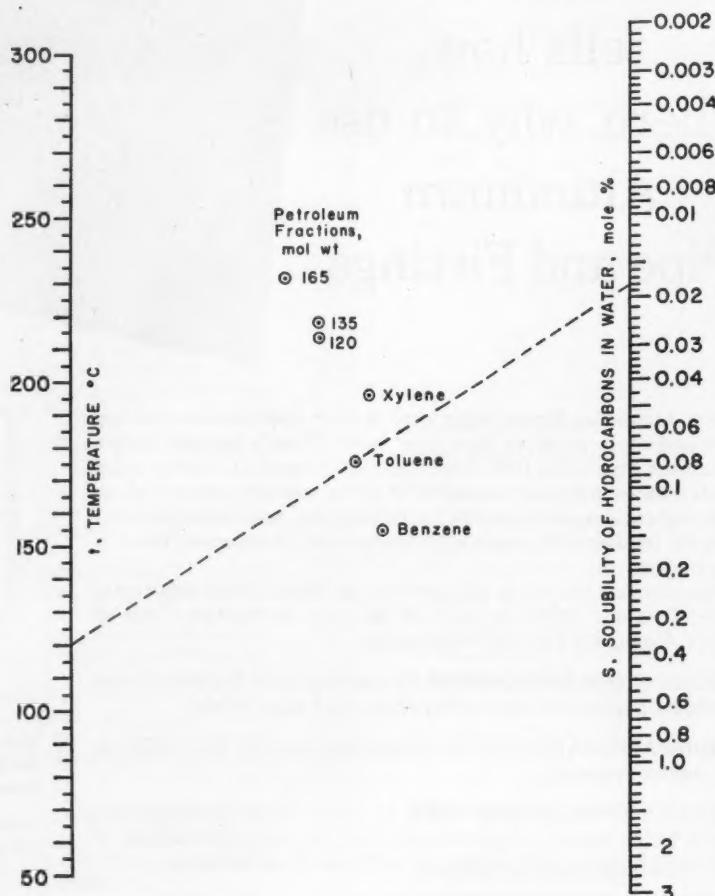
S = solubility of hydrocarbon in water mole %
t = temperature °C
a & b depend on the hydrocarbon

Typical Example

What is the solubility of toluene in water at 120°C? A straightedge through 120 on temperature scale and the toluene gage-point intersects solubility scale at 0.018 mole per cent.

LITERATURE CITED

- (1) DAVIS, D. S., "Nomography and Empirical Equations," Chap 10, Reinhold Publishing Corp, New York (1955)
- (2) GRISWOLD, J., and KASCH, J. E., *Ind Eng Chem*, Vol 34, p 804, (1942).



The adjustable-speed wedgbelt drive is a Combination...

... of American Adjustable-Diameter Sheaves, allowing stepless speed variation by internal change of pitch diameter of the sheave. Simultaneous flange movement keeps belt alignment constant. Exclusive *double-taper* hub locks flanges in position, locks sheave tight to shaft... assures positive speed control.

... of American Wedg-Tite Bushings with exclusive *steeper taper* for fast installation and easy removal, uniform compression, positive alignment, and maximum clamping action on the shaft.

... of American Wedgbelts, mold-cured to vary less than 1/4 of 1% in length, with strict uniformity in taper, thickness and width. Dacron* cords in Super-Service Wedgbelts are 2 1/2 times stronger than rayon, withstand shock loads and high starting torques.



... of American Wedg-Tite Companion Sheaves, precision-matched to the same taper of the bushing, the exact sidewall angle of the belt. Machined to a satin finish, with accurate balance and concentricity, they lower frictional power-loss, increase plant efficiency.

THE RIGHT COMBINATION FOR MAXIMUM
VARIATION OF MACHINE SPEEDS

*Reg. TM, E. I. DuPont de Nemours & Co., Inc.

The American Pulley Company

4222 Wissahickon Avenue
Philadelphia 29, Pa.

When inquiring check CP 3302 opposite last page

CHEMICAL PROCESSING

NEW LITERATURE

Explains reactance device for small motors

Printed in two colors, four-page bulletin explains a variable reactor used for speed control of shaded pole motors from 1/50 to 1/8 hp. Specifications of several models are included along with typical performance curves. Device is also pictured in application on several typical jobs.

Bul 26 is issued by Killeen & Son, Dept. CP, 340 W. Compton Blvd., Gardena, Calif. When inquiring specify CP 3303 on form which is located opposite last page.

Swatches show results of textile treatment

Improved ways to dye, destatize, and soften textile fabrics—including synthetics—are described in literature. Swatches of multifabric material are attached to illustrate results.

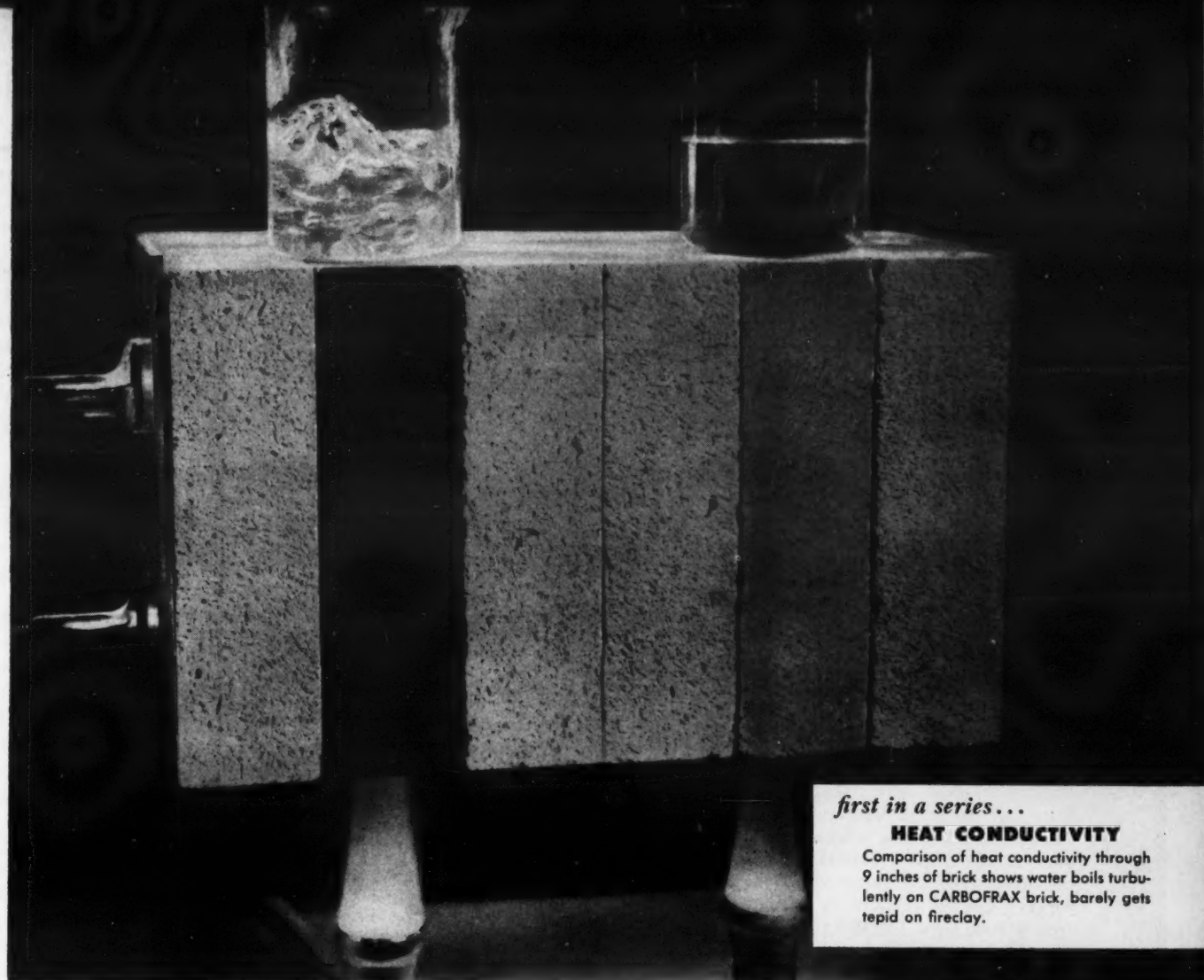
Literature on textile treatment is issued by Alframine Corporation, Dept. CP, 4731 East 52nd Drive, Los Angeles 22, Calif. When inquiring specify CP 3304 on form opp. last page.

Includes technical data for valve sizing

Catalog of 72 pages on control valves and auxiliary equipment includes 12-page section of technical data. Valve sizing, pressure drop limitations, flow characteristics, rangeability, flow coefficients are discussed.

Catalog 305 is issued by Mason-Neilan Regulator Co., Dept. CP, 1190 Adams St., Boston 24, Mass. When inquiring specify CP 3305 opposite last page.

For more information on product at right, specify CP 3306 . . . see information request blank opposite last page.



first in a series...

HEAT CONDUCTIVITY

Comparison of heat conductivity through 9 inches of brick shows water boils turbulently on CARBOFRAX brick, barely gets tepid on fireclay.

Unusual Properties of Refractory Materials

High heat conductivity—roughly 11 times that of fireclay and about 70% that of chrome-nickel steels—is one of the properties of CARBOFRAX® silicon carbide refractory brick. It is an ideal material for muffles, radiant tubes, retorts and similar structures where you need exceptional resistance to direct flame plus the ability to conduct heat efficiently. At 2200°F, thermal conductivity of CARBOFRAX brick is 109BTU/hr., sq. ft. and °F/in. of thickness.

CARBOFRAX refractories typify the many super refractories pioneered by Carborundum. Each has a wide range of properties. One, for example, is formed into precision parts that look like cast iron yet resist over 3000°F. Another, a new ceramic fiber, filters and insulates at temperatures no existing mineral or glass fiber can take.

Carborundum's new magazine "Refractories" pinpoints many practical applications for these unusual products. The forthcoming issue carries a feature article on "Heat Conductivity". Send for your copy today.

VALUABLE INFORMATION FOR USERS OF:

REFRACTORIES • CASTABLE CEMENTS • POROUS PLATES AND TUBES

CATALYST SUPPORTS • OXIDE, BORIDE, NITRIDE AND CARBIDE

HIGH-TEMPERATURE MATERIALS • CERAMIC FIBER

all in the new magazine "Refractories"

—MAIL THIS COUPON TODAY—

Dept. 516, Refractories Division
The Carborundum Co., Perth Amboy, N. J.

Please send me the forthcoming issue of "Refractories".

Name _____ Title _____

Company _____

Street _____

City _____ Zone _____ State _____

CARBORUNDUM

Registered Trade Mark

Estimating Tank Capacity

Nomograph and data courtesy of HAMMOND IRON WORKS

Tank size graph by BRUCE FADER, Associate Editor

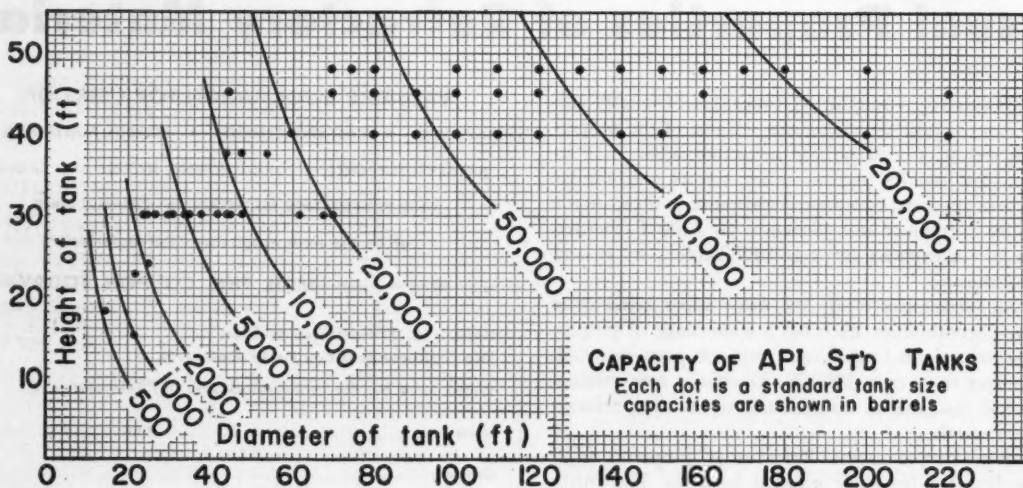
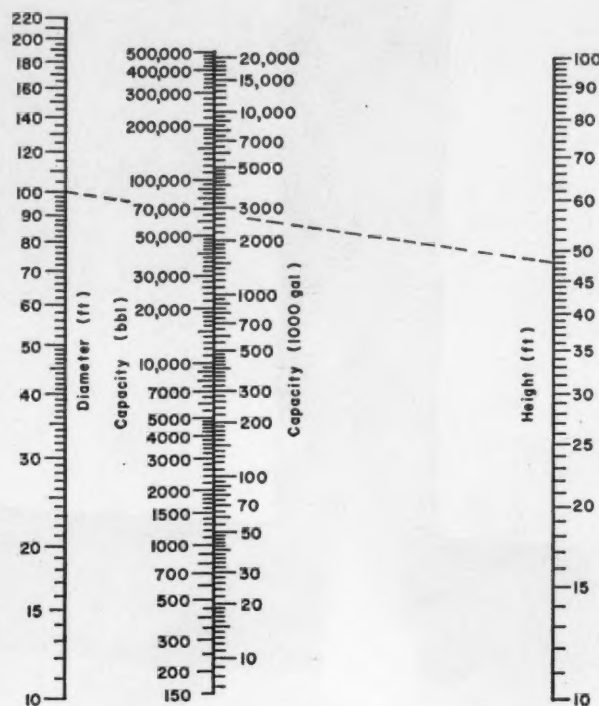
143

While many nomographs are available for finding capacity of circular tanks, not many distinguish standard tank sizes and dimensions. Graph presented with this nomograph shows dimensions of standard (12C) storage tanks as set forth by American Petroleum Institute. Graph can be used to find approximate size of tank needed; nomograph will verify size and give a more exact capacity figure.

Typical Example

Select a standard tank to hold 65,000 barrels. Refer to graph — 65,000 barrels will require a tank about 100 feet in diameter. Using nomograph, pivot straightedge about 100 on diameter scale until 65,000 is met or exceeded. First standard tank to meet this requirement is 48 feet high, and holds 67,000 barrels.

Data for this graph was taken from a 24-page tank catalog which provides more detailed tank requirements (shell thickness, type of construction, tank weight). Cat 54B is issued by Hammond Iron Works, Dept. CP, 630 5th Avenue, New York 20, N. Y. . . . or for more information check CP 3307 on form opposite last page.



Pumping Progress Report FOR CHEMICAL ENGINEERS

An advertisement prepared by the Aldrich Pump Co.,
Member of Hydraulic Institute, U.S.A.

UREA PRODUCTION, like many other chemical processes, presents difficult pumping problems. Urea slurry is both corrosive and erosive. Either condition can cause serious operational headaches; together they spell trouble for both design and maintenance engineers.

PUMPING UREA SLURRY was the problem given to Aldrich by a foremost urea producer. Our solution was effective. We recommended ...

A 6" STROKE DIRECT FLOW TRIPLEX with several modifications — porcelain plungers instead of hardened alloy steel — a Hastelloy B Fluid End. Direct Flow construction insured minimum cost replacements in the event of unavoidable corrosion damage.

ALDRICH DIRECT FLOW DESIGN offers many advantages to pump users. Two right angle turns are eliminated — the liquid being pumped travels directly, on a horizontal plane, from the suction to the discharge manifold. Reduced space between valves results in higher volumetric efficiency.

SECTIONALIZED FLUID-ENDS also afford greater economies of maintenance. Valves can be removed without special equipment. Individual sections of the fluid-end can be replaced at a fraction of the cost of conventional type fluid-ends.

DATA SHEET 67A describes the Aldrich 6" Stroke Direct Flow Pump Series, ranging in power from 300 to 900 hp. Aldrich Engineers are available to help solve your tough pumping problems. Write: The Aldrich Pump Company, 23 Gordon Street, Allentown, Pa.

When inquiring check CP 3308 opposite last page

CHEMICAL PROCESSING

Lists entire product line of fatty chemicals

Specifications and characteristics of manufacturer's entire line of products including stearic acids, oleic acids, hydrogenated fatty acids and glycerides, animal and vegetable fatty acids, special fatty acids, plasticizers, and oleic esters are presented in four-page brochure. Specifications are presented in tabular form.

"Emeryfacts, Specifications and Characteristics", is issued by Dept. 5, Emery Industries, Inc., Dept. CP, Carew Tower, Cincinnati 2, Ohio. When inquiring check CP 3309 opposite last page.

Valves, vents, and traps for heating installations

Construction, operation, and roughing-in dimensions for company's line of radiator valves, steam traps, and air vents are given in 38-page notebook. Typical installations for vacuum system, unit heater, and heating coils are presented. Cutaway views depict construction characteristics for individual units.

Cat 76-H is issued by Marsh Heating Equipment Co., Dept. CP, 3501 W. Howard St., Skokie, Ill. When inquiring specify CP 3310 on form opposite last page.

Theory and application of transistors

Theory and application of junction transistors are explained in eight-page booklet. General characteristics of transistors are explained. Typical transistor circuits are shown.

"Theory and Application of Junction Transistors" is issued by Communications and Electronics Div., Motorola, Inc., Dept. CP, 4545 W. Augusta Blvd., Chicago 51, Ill. When inquiring specify CP 3311 on form opposite last page.

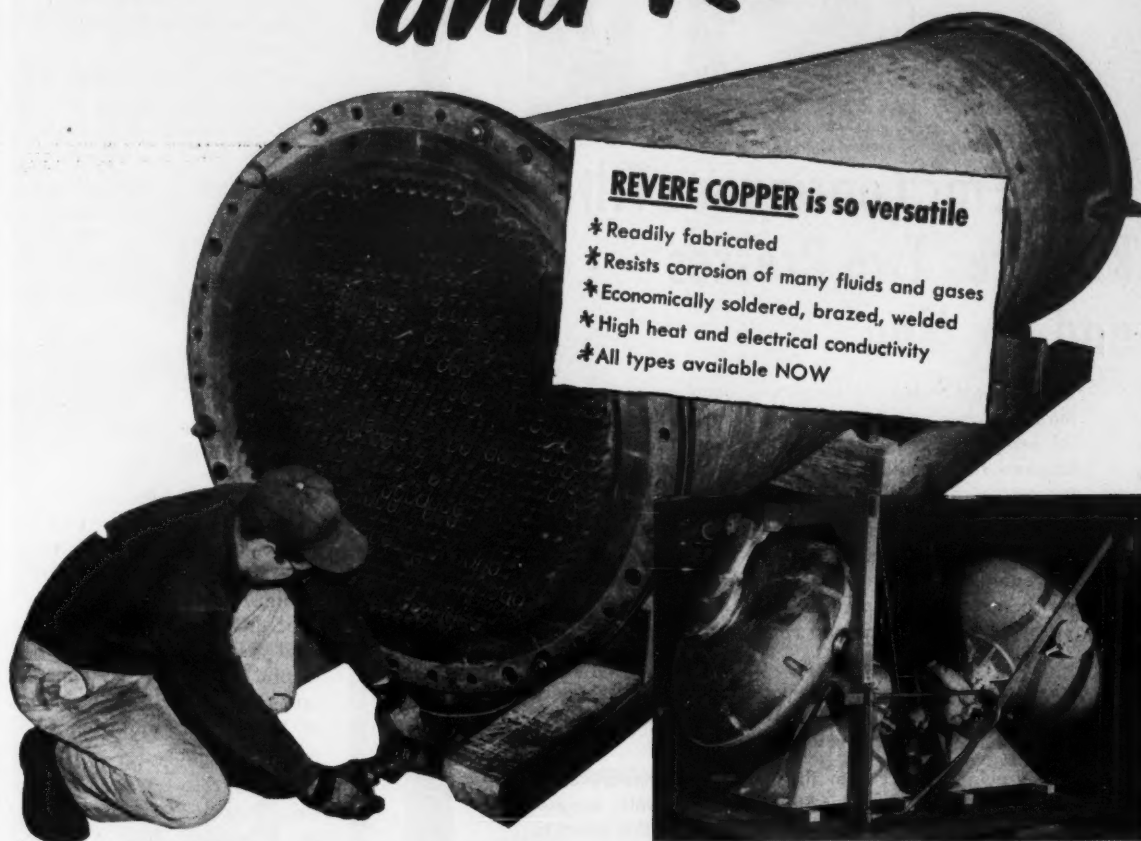
Silicone mold lubricants for rubber industry

A study of silicone mold lubricants for the rubber industry is presented in this comprehensive 8-page sprightly illustrated booklet. Properties and performance, application methods, and specific formulas are covered.

"Silicone Mold Lubricants Serve the Rubber Industry" is issued by Dow Corning Corp., Dept. CP, 592 Saginaw Rd., Midland, Mich. When inquiring specify CP 3312 opposite last page.

TWO FINE NAMES THAT WORK TOGETHER

Camden and REVERE



REVERE COPPER is so versatile

- * Readily fabricated
- * Resists corrosion of many fluids and gases
- * Economically soldered, brazed, welded
- * High heat and electrical conductivity
- * All types available NOW

UNUSUAL DESIGN for a chemical manufacturer. Note angle of ends of the 839 copper tubes. Fixed and floating heads are aluminum bronze. Photo from Camden Copper Works, Camden, N.J.

TWO COPPER mixers, used for coating and blending powder. Made by Camden Copper Works, including the rotating mechanism.

These two pictures show the versatility of Revere Copper. One, made for a chemical company, contains 839 copper tubes, and an unusual feature of the design is that the ends are cut at an angle. The fixed and floating heads are aluminum bronze. The other photograph shows two copper mixers, which rotate and are used for blending and coating powder. They are much like equipment employed in making coated candies.

These are examples of the special adaptability of copper. Both items were fabricated by the Camden Copper Works, Camden, N.J., which manufactures equipment to individual designs. Like Revere, it offers technical collaboration. It is an important Revere customer.

Remember, the copper shortage is over. Revere

Copper is freely available now in plate, sheet, strip; rod and bar; tube and pipe; extruded shapes; forgings; lockseam tube and rolled mouldings. See the nearest Revere Sales Office. Write for free booklet, "Life Extension for Condenser Tubes."

REVERE

COPPER AND BRASS INCORPORATED

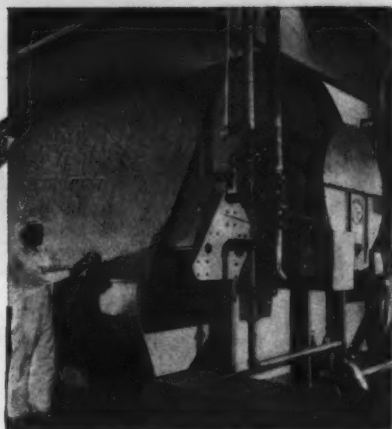
Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities, Distributors Everywhere

When inquiring check CP 3313 opposite last page

IN PECTIN EXTRACTION



One FEinc Continuous Filter Replaces Two Presses and Six Men

Looking at this clean, quiet picture, you'd never know this filtration job was formerly a hot, steamy mess, requiring six men per shift to load and unload wet, acid-laden press blankets, racks and press cars of two stop-and-go hydraulic presses.

Now it's a smooth-running, really continuous filtration operation, on this big FEinc String Discharge Filter. Only one operator is now required, with very little to do except watch the cake roll off hour after hour. Even the daily washup takes little time and effort.

Pectin recovery is reported to be as good as formerly. Losses due to leakage and spillage have been eliminated. The dynel cloth on this filter lasts more than a year . . . a substantial saving in the cost of filter cloth.

The pulp is lifted from the filter by continuous orlon strings . . . the famous FEinc String Discharge which successfully handles all types of cakes ranging from thin slimes to thick heavy sludges. There's no smearing, blinding or plugging of the fabric, and no loss due to "blow-back."

You too can improve production rates at lower cost in many of your filtration operations with the continuous . . . really continuous . . . FEinc String Discharge Filter. Find out more about what these versatile efficient filters can do for you. And ask about the new FEinc Horizontal Rotary Vacuum Filter for crystalline or fibrous pulps. Write today.

Ask for
Bulletin 103



CUSTOM DESIGNERS AND MANUFACTURERS OF ALL
TYPES OF CONTINUOUS FILTRATION EQUIPMENT

Filtration Engineers, Inc.

FEinc

155 ORATON STREET • NEWARK 4, N. J.

When inquiring check CP 3314 opposite last page

NEW LITERATURE

How to protect workers from radiation

Printed in two colors, specification sheet describes film badges for personnel protection. Worn on a shirt or wrist, these indicate amount of radiation to which workers are exposed. Film responds to X-rays or radioactive isotopes.

Specification sheet explains that film may be read for any gamma or X-ray exposure between 50 and 300,000 milliroentgens.

"Film Badges" is available from Nuclear Instrument & Chemical Corp., Dept. CP, 223 W. Erie St., Chicago 10, Ill. When inquiring specify CP 3315 on form opposite last page.

V-belt selection table and design hints

Quick and easy selection of constant speed Texrope V-belt drives is explained by tables in 74-page data booklet. Valuable information on design features, basic drive principles, and technical data on sheaves as well as helpful hints for economical, safe, and dependable operation of V-belt drives are given.

"Tex-Book 20P40" is issued by Allis-Chalmers Manufacturing Co., Dept. CP, 1151 S. 70th St., Milwaukee, Wis. When inquiring check CP 3316 on form opposite last page.

High temp water system of heat distribution

Heat distribution, using forced recirculation generators in high temperature water systems, is covered in ten-page, fold-out bulletin. Typical installations are presented schematically.

Bul 700 is issued by The International Boiler Works Co., Dept. CP, Palm Street, East Stroudsburg, Pa. When inquiring specify CP 3317 on form opposite last page.

Sicon Protects

HEAT RESISTANT FINISH



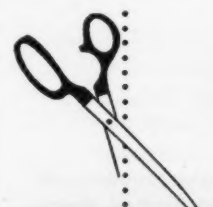
Small Parts For After-Burners of PRATT & WHITNEY AIRCRAFT J48 TURBO JET ENGINE

No better proof of Sicon's remarkable film properties and color retention can be shown than this—its ability to protect jet engine parts under punishing high heat! Sicon is easy to apply by brush, spray, or dip to any chemically clean surface. For protection in the 1000°F. range, or for colorful whites, beiges, golds, greens, etc., in the 550°F. range—SICON is unbeatable.

Write today, without obligation, for revealing details of notable SICON applications on both industrial and consumer products.

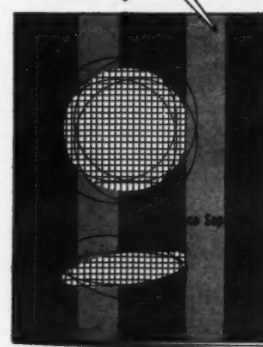


When inquiring check CP 3318 opposite last page



Send for new 22-page

SCREENING CATALOG



Photos, drawings, detailed specifications of equipment now successfully screening

241 different materials
wet and dry
coarse and fine
heavy and light.

Southwestern Engineering Company
4900 Santa Fe Ave., Los Angeles 58, Calif.
Please send Catalog No. 47-3

name	_____	title	_____
company	_____		
address	_____		
city	_____	zone	state

When inquiring check CP 3319 opposite last page

CHEMICAL PROCESSING

Shows typical applications for vibrating feeders

Printed in two colors, 16-page booklet pictures wide variety of vibrating feeders and conveyors. Open and closed types are shown and described. Special designs for spreading, control feeding, diagonal discharge, high temperature work, and other unusual applications are described. One interesting unit pictured in booklet is used with bank of infrared lamps for drying or preheating operations.

PO #07702 is issued by Syntron Co., Dept. CP, Box 220, Homer City, Pa. When inquiring specify CP 3320 on form opposite last page.

Organic chemicals in commercial or semi-works quantities

Organic chemicals produced in commercial or semi-works quantities are subject of catalog. Products are indexed under Chemical Abstracts name and most common synonyms. Product description, minimum standards governing shipment, and hazards are listed.

"Organic Chemical Catalogue" is issued by Antara Chemicals Div. of General Aniline And Film Corp., Dept. CP, 435 Hudson St., New York 14, N.Y. When inquiring specify CP 3321 on form opposite last page.

Lists pneumatic regulators for instruments

Bulletin of eight pages lists complete line of pneumatic regulator equipment including: filter-regulator combinations, filters and regulators, relays, purge assemblies, and control panels. Booklet is in two colors. Bulletin is illustrated with cross-sectional and dimensional drawings. Typical applications for use are suggested.

Bulletin H2 is issued by Conoflow Corporation, Dept. CP, 2100 Arch St., Philadelphia 3, Pa. Specify CP 3322 on form opposite last page.

Grade, size ranges, and types of seamless welding fittings

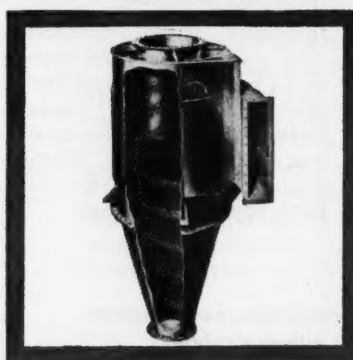
Fold-out, six-page bulletin lists grades, size ranges, and types of seamless welding fittings. Dimensional tolerances of ASA for seamless steel butt-welding fittings are given.

Bul FB-500 is issued by The Babcock & Wilcox Co., Dept. CP, Beaver Falls, Pa. When inquiring specify CP 3323 on form opposite last page.

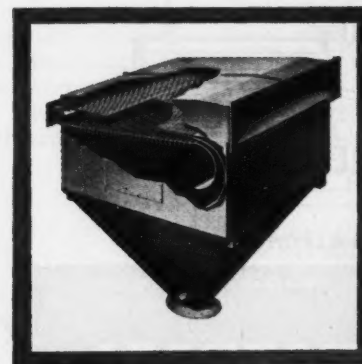
Electrode Breakage Is no problem in Buell "SF" Electric Precipitators



Besides eliminating efficiency drops and "shutdowns" due to electrode breakage, Buell's unique Spiralectrode permits higher and more constant emission, extra efficiency. Also, Continuous Cycle Rapping—another Buell exclusive—keeps electrodes constantly clean for maximum performance!



Buell Cyclones offer two "extra-efficiency" advantages: (1) exclusive shave-off which harnesses double-eddy and puts it to work, and (2), large diameter design which eliminates clogging.



Buell's Low Resistance Fly Ash Collector combines top efficiency with low draft loss, for natural or forced draft installations. Ideal for boilers from 100 to 2000 BHP.



For more specific data about Buell's extra efficiency, write Dept. 11-A, Buell Engineering Company, 70 Pine Street, New York 5, N. Y.

buell



Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**

When inquiring check CP 3324 opposite last page



New! TUBULAR FILTERS by Industrial

WITH IMPORTANT NEW FEATURES
DUE TO FLOW FROM INSIDE OF TUBE

- ★ Unequaled simplicity of maintenance.
- ★ Solids can be recovered in dry form.
- ★ Liners are easy to replace and inexpensive.
- ★ Ideal for intermittent or continuous operation.
- ★ Chamber can be emptied without losing cake.
- ★ No unfiltered "heel".
- ★ Can be used with or without pre-coat.
- ★ Ideal for polishing . . . as a trap filter . . . and as a scavenger for larger filters.

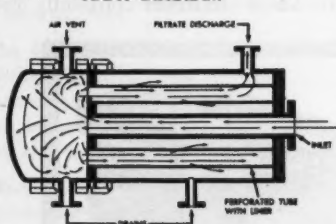
NEW SIMPLIFIED OPERATION

The filter is prepared for use by simply rolling flat sheets of filter paper and inserting them in the tubes, which are designed to force the paper snugly against the tube wall.

EASY TO CLEAN

Filter papers are simply withdrawn and replaced. Even the tubes are easy to remove, being held in place by a simple rubber O-Ring device. Except for the cover there are no nuts and bolts to handle.

FLOW DIAGRAM



FOR FULL DETAILS WRITE FOR BULLETIN TS-160-755.

CENTRIFUGAL PUMPS • PRESSURE FILTERS • ION AND HEAT EXCHANGERS • RUBBER LININGS • WASTE TREATING EQUIPMENT

Industrial

FILTER & PUMP MFG. CO.

5908 OGDEN AVENUE • CHICAGO 30, ILLINOIS

When inquiring check CP 3325 opposite last page

NEW LITERATURE

Gives new literature check list

Manufacturer's reference manual and handbooks, chemical bulletins and data sheets, product folders and leaflets, and miscellaneous publications are all cataloged in ready-reference index. Checklist makes it easy to find if he has literature available on any specific phase of the chemical or agricultural industries.

"Checklist of Helpful Diamond Literature" is issued by Diamond Alkali Company, Dept. CP, Union Commerce Bldg., Cleveland 14, Ohio. When inquiring check CP 3326 on form opposite last page.

Insecticide aerosol formulation data

Insecticide aerosols and pressurized container formulation data are given in series of technical bulletins. Pyrenone and chlorinated hydrocarbons in a number of types of fly sprays are described.

Insecticide aerosol technical data are available from Fairfield Chemical Div., Food Machinery & Chemical Corp., Dept. CP, 420 Lexington Ave., New York, N.Y. When inquiring check CP 3327 on form opposite last page.

Properties, performance of silicone rubber

Properties and performance of silicone rubber affected by extreme temperatures, weathering, compression, chemicals, and dielectric service are detailed in four-page, two-color technical bulletin. A number of photographs, tables, and graphs accompany the text.

"Silastic" (Bul 9-102) is issued by Dow Corning Corp., Dept. CP, 592 Saginaw Rd., Midland, Mich. Specify CP 3328 opposite last page.

PISTON PACKING

PROBLEMS SIMPLIFIED!



Conventional and 45° bevel type Pumcups.

• The right piston packing for reciprocating pumps and cylinders goes a long way toward eliminating the problems of slippage, maintenance and down-time.

Because Darcoval Pumcups are made in a complete range of sizes, various types, and in many texture-engineered compositions, they fit your temperature-pressure-fluid conditions. That's one important reason why they usually outlast other packing at least 3 to 1 while holding top efficiency to the last!

Why not get all the facts? Send today for Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

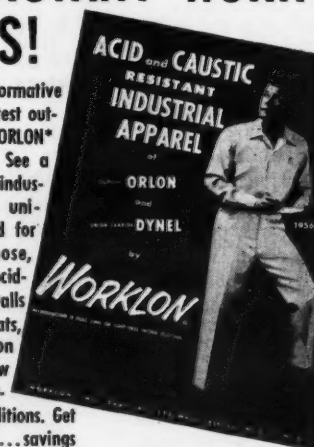


TRADE MARK
Pumcups

When inquiring check CP 3329 opposite last page

ACID RESISTANT WORK CLOTHES!

Now assembled in one informative new catalog . . . all the latest outstanding developments in ORLON® and DYNEL work clothes! See a tremendous selection of industrial apparel and service uniforms, performance-proved for every need, every purpose, every industry! Discover acid-resistant shirts, pants, coveralls, men's and women's lab coats, that outlast wool and cotton by 50 to 1! Learn about new lint-free acid-resistant garments for super-clean conditions. Get longer wear with less care . . . savings up to 93%! Send for Worklon's FREE 1956 catalog today!



*—DuPont Orlon acrylic fiber

WORKLON

WORKLON, INC., Dept. CP 1
253 West 28th St., New York 1, N. Y.

Please rush my free copy of Worklon's new 1956 catalog.

firm name _____
address _____
city _____ zone _____ state _____
attn. of _____ dept. _____

When inquiring check CP 3330 opposite last page

CHEMICAL PROCESSING

**Polyalkylene-glycol derivatives
as heat-transfer fluids**

Technical data on the use of polyalkylene-glycol derivatives as heat-transfer fluids are given in four-page folder. Solubility characteristics and a nomograph and tables outlining typical properties are included. Limitations and precautions advised in applying fluids are outlined.

Bul F-7490C is available from Carbide and Carbon Chemicals Co., Div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring specify CP 3331 on form opposite last page.

**Highlights versatile service
of heavy-duty gear pump**

Applications of heavy-duty gear pump in chemical, petroleum, and power industries are highlighted in eight-page, two-color booklet. Special materials of construction for corrosive service are also treated. Standard specifications and capacities are included.

Bul H-2 is issued by Sier-Bath Gear and Pump Co., Inc., Dept. CP, 9252 Hudson Blvd., North Bergen, N.J. When inquiring specify CP 3332 on form opposite last page.

**Tells about setting up
medical programs**

Pocket-size eight-page brochure discusses question of setting up a company medical program. It is designed for executives and men with safety responsibilities. Chief concern is cost and evaluation of company programs.

"Medical Program" is issued by Occupational Health Institute, Inc., Dept. CP, 6 E. 39th St., New York 16, N. Y. When inquiring specify CP 3333 on form opposite last page.

**What refractometers measure
— how they operate**

Eight-page bulletin in two colors illustrates operational principles of *process* refractometers. Application suggested is in petroleum industry, controlling a fractionator. An application to blending control is also suggested.

Bul 1839 is issued by Consolidated Engineering Corp., Dept. CP, 300 N. Sierra Madre Villa, Pasadena 15, Calif. When inquiring specify CP 3334 on form opposite last page.

Are your valves over their heads in corrosive reducing solutions?

Switch to Aloyco Monel or Nickel Valves!



ALOYCO MONEL VALVES are used extensively in handling alkalis, salt waters, food products, organic substances, and many air-free acids.

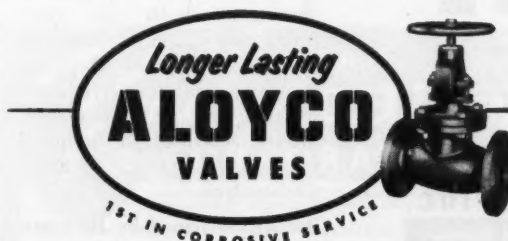
Keeping corrosive solutions of mineral and organic acids, alkalis and salts under control is a job for Aloyco Monel or Nickel valves.

Monel valves are especially good for handling hydrofluoric acid which is used as a catalyst in one process for the production of high octane gasoline. Monel and Nickel have exceptional resistance to neutral and alkaline salt solutions, including chlorides, carbonates, sulfates, nitrates and others. Nickel is more resistant than Monel to more concentrated NaOH solutions at elevated temperatures and is usually preferred when

contamination of the caustic with copper or iron would be objectionable.

Nickel, although similar to Monel in corrosion resistance, has generally an inferior resistance to acids, about the same resistance to salts and a little better resistance to alkalis.

Both alloys are available in a wide range of Aloyco valve designs. They're cast by induction melting at Aloyco foundries and machined in Aloyco plants. New bulletin #9, couponed below, provides complete information. Write today to ALLOY STEEL PRODUCTS CO., INC., Linden, N. J.



Alloy Steel Products Company, Inc.
1302 West Elizabeth Avenue
Linden, New Jersey

Gentlemen:

Please send me a free copy of your Bulletin No. 9 on Monel and Nickel valves.

Name _____

Firm _____

Address _____

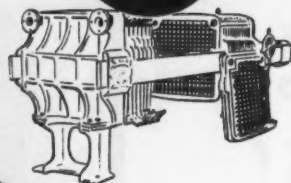
City _____ Zone _____ State _____

When inquiring check CP 3335 opposite last page

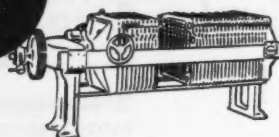
It's Our Job to Provide the RIGHT FILTER PRESS for Your Job

Take a closer look at the job you want your filter to do, and you'll find in the Shriver Filter Press economy and versatility of performance unmatched by any other type of filter. Whether you filter for cake recovery or for crystal clarity of liquid, or combine these operations with washing, extraction or drying, in the Shriver Filter Press you get multiple functions in a single, simple unit, easy to operate at minimum cost.

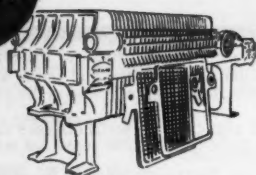
Filter
to Recover
Solids



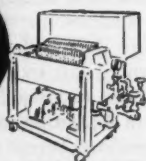
Clarify
•
Purify



Wash
Extract
Redissolve
Melt



Filter
without
Leakage or
Evaporation



Thicken
•
Leach



Shriver

Shriver Filter Presses are made in all types and sizes for use with any filter media, to operate at any pressure and temperature. Catalog 55 tells how. Write for a copy.

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Filters • Filter Media • Diaphragm Pumps

846 Hamilton Street • Harrison, N. J.

Sales Representatives in Decatur, Ga.; Houston, Tex.,
St. Louis, San Francisco, Montreal, Toronto

When inquiring check CP 3336 opposite last page

NEW LITERATURE

Study of oil industry's diversified products

2347 products — plus. That's how many products the US oil industry made in June, 1955 when the American Petroleum Institute published their oil industry background information bulletin. Included in this bulletin is a discussion of the uses and needs these products fill in contributing to the American way of life.

Bulletin No. 11 has eight pages, including a two-page product flow diagram, and is available from American Petroleum Institute, Dept. CP, 50 W. 50th St., New York 20, N.Y. When inquiring check CP 3337 on form opposite last page.

Views variety of valves

Photographs and descriptive information on different types of valves are presented in eight-page bulletin. Horizontal check valves, gate valves, sampling valves, and quick-closing valves are among those covered.

Bul GV-11 is issued by Greenwood Valve Div., Vernon Tool Co., Ltd., Dept. CP, 1101 Meridian Ave., Alhambra, Calif. When inquiring specify CP 3338 on form opp. last page.

Automatic Infrared unit described

Illustrating performance of an automatic infrared spectrophotometer with two spectrums, one of polystyrene, the other of p-xylene, four-page two-color bulletin gives full specifications of instrument. Model described is designed for both research and quantitative analysis.

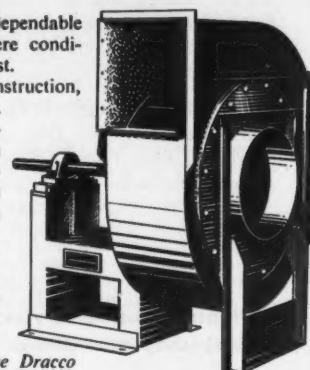
Bul 410 is issued by Beckman Division, Beckman Instruments, Inc., Dept. CP, Fullerton, Calif. Specify CP 3339 on form opposite last page.

dracco industrial fans

FOR
BETTER
AIR
HANDLING

Dracco Fans assure dependable operation, withstand severe conditions, have low lifetime cost.

Heavy gauge steel construction, welded and vibration-free. Precisely balanced. No castings to crack. Accurate shaft. Rotation and discharge adjustable. Wide range of sizes: volumes from 500-46,000 CFM. "Performance Proved" by 15 years' service with Dracco Dust Control systems. For details, contact:



Write for 40-page Dracco Fan Bulletin No. 601 containing complete performance data and specifications.

DRACCO CORPORATION
4070 EAST 116th STREET
CLEVELAND 5, OHIO

When inquiring check CP 3340 opposite last page

NEW POCKET CALCULATOR For Liquid Batch Mixing

CAPACI-DIAL for
PNEUMIX

AGITATORS

Simply turn the pointer to the particular volume and consistency of your batch. The selector automatically tells the best size Pneumix Agitator to do your mixing.



The attached
coupon will
get you one
without
obligation.

ECLIPSE AIR BRUSH CO.
390 Park Ave. Newark 7, N.J.

Please send free CAPACI-DIAL to:

Name

Company

Address

When inquiring check CP 3341 opposite last page

CHEMICAL PROCESSING

Valuable data furnished on stainless steels

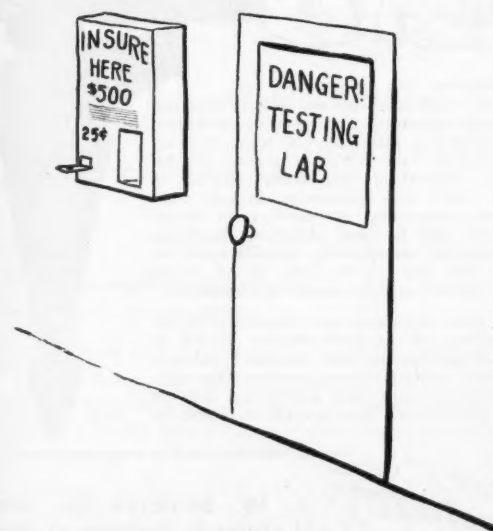
One of the most valuable portions of 164-page fabricator's handbook is a 20-page section tabulating the composition, characteristics, and corrosion-resistance of a number of different types of stainless steel. Handbook also contains information on forming, machining, cutting, joining, and methods of heat treating and pickling, and finishing different types of stainless steel.

The Fabricator's Handbook on stainless steels is issued by Crucible Steel Company of America, Dept. CP, Oliver Bldg., P.O. Box 88, Pittsburgh 30, Pa. When inquiring specify CP 3342 on form opposite last page.

Boiler plant instruments in two colors — 24 pages

Manufacturer's line of instruments and controls for boiler plants is described in 24-page booklet with two colors. Instruments are described for flow and liquid level control, combustion testing, temperature and pressure, combustion control and draft. Simplified drawings of control systems for stoker-fired, gas-fired, oil-fired, and pulverized coal furnaces are included.

Pub 55-605-83 is issued by The Hays Corp., Dept. CP, 742 E. Eighth St., Michigan City, Indiana. When inquiring specify CP 3343 on form opposite last page.



Technical data on the revolutionary new

holo-flite*

(HOLLOW-FLIGHT)
PROCESSOR

If you have processing operations where slurries, solids, pulps or pastes must be cooled or cooked, be sure to investigate the many unique advantages of the newly-developed HOLO-FLITE Processor before you install any heat-exchange equipment.

Here's the HOLO-FLITE principle...

Two or more screw conveyors rotate slowly in a trough. The blades and shaft of each flight of conveyors are hollow, with provision for circulating the heat-transfer agent through them. The product to be cooled or cooked is moved along the trough, being constantly rotated into, around, over and under the conveyor screws as it moves.

Thus, a continuous thermal transfer takes place between the product and the heat-transfer fluid circulating in the blades. The product is cooled or cooked in continuous-flow without the "stop-and-go" losses of batching operations... and cooled products can be packaged directly from the HOLO-FLITE discharge—saving space, time and additional handling.



THIS 6-TIER HOLO-FLITE cools 7 tons of cottonseed press cake per hour from 285° to 89°F. in a total floor space of only 28 sq. ft.
(Inset) Enlarged cutaway view of HOLO-FLITE screw showing heat-transfer principle.

Here are typical HOLO-FLITE advantages

The HOLO-FLITE principle is so unique it is setting completely new standards of performance in many ways. For example...

The HOLO-FLITE Saves Space
—It requires as little as 1/5th the space of other units of comparable capacity because (1) it has far greater heat-transfer area per cubic foot of space... and (2) the flights can be "tiered" as high as desired to give maximum capacity in very small floor areas.

The HOLO-FLITE is Versatile—Processed product can be fluid, pulp or paste—granular, crys-

talline or powdered solid. Heat-transfer fluid can be refrigerant, cooled or ambient water, steam, oil or any other desired fluid, at any normal temperature range.

The HOLO-FLITE is Dust-Free
—Its gentle action provides large heat-transfer action without dust and with negligible particle abrasion. Simplifies installations, assures higher quality product.

The HOLO-FLITE is Adaptable
—It can easily be designed to handle virtually any capacity by (a) varying the diameter of the screws (7" to 16")... (b) varying the length of the screws (8 ft. to 20 ft.)... (c) varying the number of intermeshing screws per trough (2, 4, or 6)... and (d) varying the number of tiers stacked on top of one another (1 to 10, or more).

WESTERN
Precipitation
CORPORATION

DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1023 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
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HOBART BUILDING, SAN FRANCISCO 4
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

The HOLO-FLITE is in daily operation on such typical products as sand, cement, cottonseed cake, soybean meal, borax, salt, sugar, baby foods and many other equally-varied products.

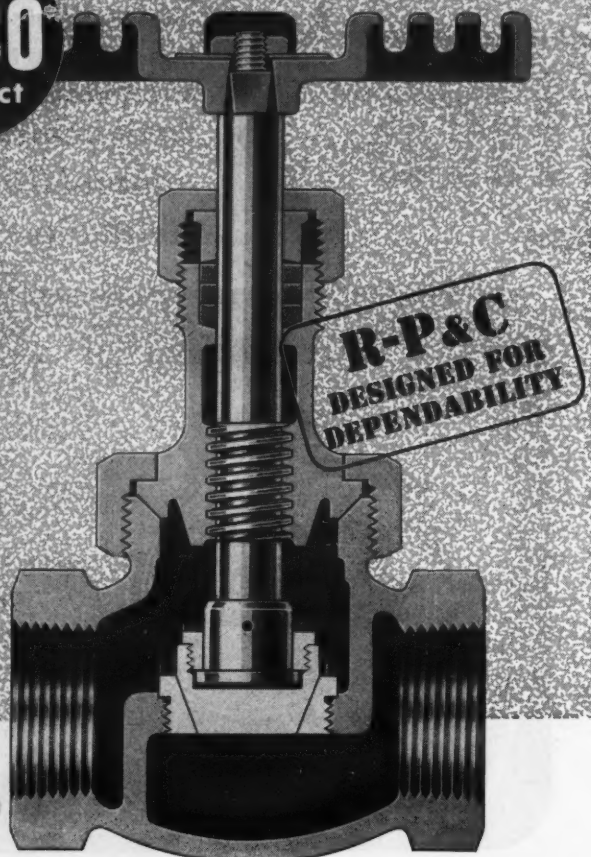
What is your problem? Our engineers will be glad to assist you in making the most of HOLO-FLITE advantages. Write wire, or phone the office nearest you!

Want More Facts? This 8 page booklet describing the HOLO-FLITE in greater detail will gladly be sent on request. No obligation, of course.



When inquiring check CP 3344 opposite last page

an
ACCO
product



"Reliable
Protection
& Control"

New R-P&C Bronze Globe Valve

- STAINLESS STEEL SEAT AND DISC (500 BRINELL)
- FULL-PLUG FOR CLOSER REGULATION, LONGER LIFE

R-P&C's new Fig. 427-DP bronze globe valve is recommended for steam, water, oil and gas service where control or regulation of flow is required. Its 500 Brinell stainless steel seat and disc resist wire-drawing—make it particularly suitable for continuous throttling and other severe applications.

• The Fig. 427-DP is packed with the quality features that users expect from R-P&C. For example, the union bonnet for added strength and convenience, and a disc and seat ring construction which permits regrinding without removing the valve from the line. The full-plug construction, with its exceptional wide seating surface, gives closer control, longer life.

• The Fig. 427-DP is rated for 300 lbs. Steam—1000 lbs. owg in sizes ¼" to 2", and 600 owg in sizes 2½" and 3". Also supplied as an angle valve. Precisely designed, it is a fitting addition to R-P&C's complete line of bronze valves—gates, globes, angles and checks, in pressure classes from 125 to 300 lbs. See your R-P&C Distributor or write for catalog.

ACCO



**R-P&C Valve Division
AMERICAN CHAIN & CABLE**

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit,
Houston, New York, Philadelphia, Pittsburgh, San Francisco,
Bridgeport, Conn.

**R-P&C
valves**

When inquiring check CP 3345 opposite last page

NEW LITERATURE

Diagrams explain operation of pool washing screens

Pool washing screens for handling limestone, lead, zinc, sand, coal, and similar materials are described in eight-page bulletin. Diagrams explain how units provide efficient wet screening and effective media recovery while conserving water, increasing screening capacity, minimizing blinding, and promoting long screen surface life.

Bul 07B8214 is issued by Allis-Chalmers Manufacturing Company, Dept. CP, 1151 S. 70th Street, Milwaukee, Wis. When inquiring specify CP 3346 on form opposite last page.

Formulation data on insecticides

Series of technical bulletins gives detailed product and end-use data on many types of insecticides. Typical formulations, sample label statements, and chemical descriptions are given. Specifically covered are roach and ant sprays, horticultural sprays, cow bombs, pet sprays and shampoo, and insect repellents.

Technical data bulletins are issued by Fairfield Chemical Div., Food Machinery & Chemical Corp., Dept. CP, 420 Lexington Ave., New York, N.Y. When inquiring specify CP 3347 on form opp. last page.

Open blast burner nozzles for air-gas mixtures

Four-page pamphlet covers standard, and alloy nozzles, mounting supports, and helpful information on the burning of air-gas mixtures. Operating data, complete specifications, and installation information are included.

Bul H-15 is issued by Eclipse Fuel Engineering Co., Dept. CP, 1002 Buchanan St., Rockford, Ill. When inquiring specify CP 3348 on form opposite last page.

LEARN ABOUT *Speedline* STAINLESS STEEL FITTINGS



22 Illustrated Pages
Tell You HOW and
WHY SPEEDLINE
FITTINGS

- Speed piping installation
- Simplify design and assembly
- Cut process piping costs!

Write for YOUR Speedline Fittings Catalog Today...
It's the Biggest News in Process Piping in Years!

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Speedline STAINLESS STEEL FITTINGS

manufactured by **HORACE T. POTTS COMPANY**
502 East Erie Avenue • Philadelphia 34, Pa.

When inquiring check CP 3349 opposite last page

Solve your needs in PRODUCT RECOVERY with Banister Dustmasters



Dustmasters are scientifically designed, moderately priced cyclone type mechanical separators. They give you outstanding collection efficiency (in some cases up to 99.8%) with minimum power requirements. Typical of their many uses are in spray dried milk processing, in food component conveying, in vinyl resin manufacture, and in loose chemicals handling. *Dustmasters* are carefully manufactured for long life, and are available in hot rolled steel, monel, stainless steel, or aluminum.

Our wide experience and knowledge of applications can be tremendously helpful to you in getting the most practical and economical product recovery system. Our engineering laboratory will gladly run tests on your product and make specific recommendations.

Send for catalog or send us your requirements.



A. W. Banister Co., Inc.
21 Charles St., Cambridge 41, Mass.

System engineers & manufacturers since 1911

When inquiring check CP 3350 opposite last page

CHEMICAL PROCESSING

Gives data on applications of sprayed metal coatings

Considerable data on the application of sprayed metal coatings to processing equipment, containers, tank cars, and other products are given in four-page bulletin. Coatings discussed prevent contamination and provide corrosion protection. Bulletin also covers combinations of a number of other types of coatings with sprayed metal to provide corrosion protection.

"Sprayed Metal Coatings" is issued by Metalweld, Inc., Dept. CP, Scotts Lane & Abbottsford Ave., Philadelphia 29, Pa. When inquiring specify CP 3351 on form opposite last page.

Catalogs lab thermometers — other equipment

Eight-page booklet catalogs laboratory thermometers. Other laboratory equipment described includes analytical balance weights, stop timers, thermo-regulators, circulating pumps.

Catalog is issued by Lux Scientific Instrument Corp., Dept. CP, 935 Broadway, New York 10, N. Y. When inquiring specify CP 3352 on form opposite last page.

Cellular glass insulation for piping, equipment

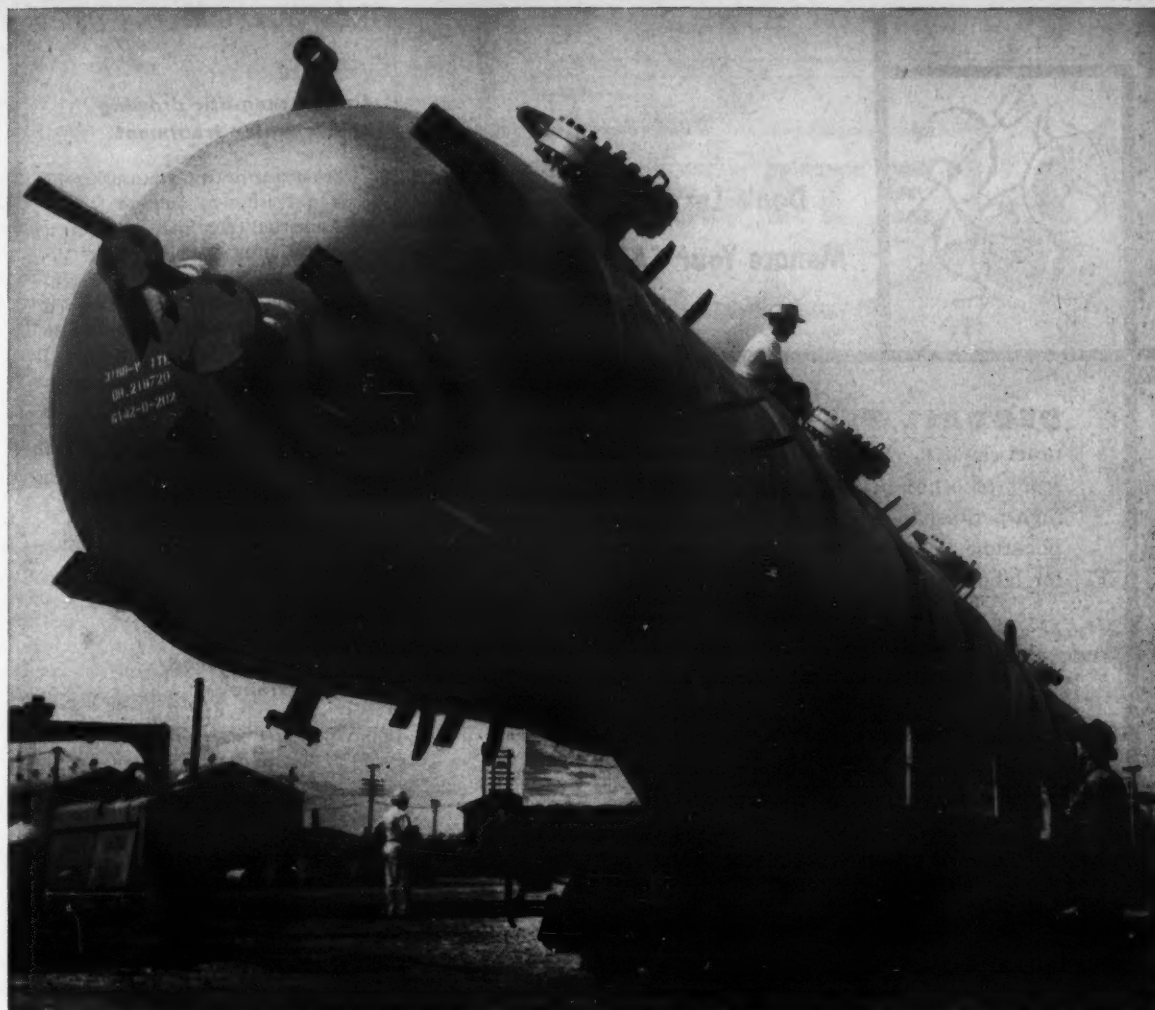
Physical properties of cellular glass insulation are given in eight-page, two-color catalog. Condensed recommended specifications and application photographs are presented. Tables outline suggested thicknesses for temperatures ranging from -50° to $+800^{\circ}\text{F}$ and give sizes and shapes available.

Bul FI-103 is available from Pittsburgh Corning Corporation, Dept. CP, One Gateway Center, Pittsburgh 22, Pa. When inquiring specify CP 3353 on form opposite last page.

Discusses continuous process for rubber reclamation

Bulletin of two pages describes continuous method for devulcanizing rubber. Suggested process cuts processing time from hours to minutes. Data sheet includes flow sheet and short description of equipment.

Application Memo K5 is issued by Proportioneers, Inc., Div. of B-I-F Industries, Inc., Dept. CP, 345 Harris Ave., Providence, R. I. When inquiring specify CP 3354 on form opposite last page.



THIS ENTIRE VESSEL was radiographed. Built for use by Socony Mobil Oil Company, Incorporated, it was stress relieved in thirds, and the two joints were stress relieved locally. The unit contains 30 uniflex trays of 96" diameter. Overall weight: 152,000 lbs.

Among the largest in use

...built by Newport News

This Debutanizer with a 110 feet 6 inches over-all length is typical of units that are readily built by Newport News...

In fact, Newport News can fabricate almost any type of pressure vessel or other heavy equipment used in the petroleum, chemical or other processing industries.

But at Newport News you'll find

Engineers—Desirable positions available at Newport News for Designers and Engineers in many categories. Address inquiries to Employment Manager.

more than large productive capacity.

In vast fabricating shops, in huge machine shops, foundries and forging plants, Newport News craftsmen complete your order with specialized techniques. Plant methods... developed as a result of specializing for more than half a century... enable Newport News to provide money-saving answers to all sorts

of heavy equipment problems.

Newport News craftsmen handle the job exactly as you want it done... for maximum results per dollar invested. So let us bid on your present or future projects. Learn how Newport News can help you. Send for our illustrated booklet entitled, "Facilities and Products"...it's yours for the asking.

Newport News Shipbuilding and Dry Dock Company
Newport News, Virginia

When inquiring check CP 3355 opposite last page



Don't Let The Odor Imp Menace Your **SALES EFFORTS!**

DEODALL #1 has proved effective in commercial practice for masking solvent odors and the unpleasant scent of other petroleum products. *Deodall #1* gives high performance at *low cost* in a wide variety of applications. Why not send us a sample of your product for laboratory study and recommendations.

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Industrial Aromatics and Chemicals

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Illustrated Bulletin Presents Newest Designs of Union Process Heating Equipment



Just published, illustrated Bulletin DV presents the full line of Union Process Heating Equipment for use in a tremendous variety of applications: high temperature molding; manufacturing paint, varnish, etc.; processing food products; plating tin; melting solders, asphalt; evaporating high boiling materials; petroleum refining . . . plus numerous others.

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NEW LITERATURE

Large schematic drawing shows water treatment

Schematic drawing measuring 11 x 17" shows complete instrumentation for water treatment plant. It is contained in a 12-page, two-color bulletin. Purification processes are described and application of instruments are pointed out in detail. Several illustrations show typical installations.

Bul 90-241-10 is issued by Fischer & Porter Co., Dept. CP, 48 Jacksonville Rd., Hatboro, Pa. When inquiring specify CP 3358 on handy form opposite last page.

Meet an improved polyethylene

A polyethylene which has greater heat resistance, structural stiffness, and appearance than the regular product is described in illustrated booklet. The 16-page bulletin is profusely illustrated, presents specifications, properties, and list of suggested applications of Super Dylan polyethylene.

Bulletin C-5-216 is issued by Chemical Div., Koppers Company, Inc., Dept. CP, 1301 Koppers Bldg., Pittsburgh 19, Pa. When inquiring check CP 3359 on handy form opposite last page.

Blower's advantages and uses given

Advantages of using blower for step aeration, air flotation of solids and greases, and process work are outlined in four-page, two-color folder. Performance curves, specification data, and typical installations for blowers in sizes up to 250 hp are given.

Bul 142-B may be obtained from Spencer Turbine Company, Dept. CP, 484 New Park Ave., Hartford, Conn. When inquiring specify CP 3360 on form opposite last page.

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NEW LITERATURE

Spray-on plastic coating described in bulletin

Composition, properties, and specifications of vinyl plastic coating applied by spraying are given in four-page, two-color pamphlet. Photos show indoor and outdoor installations. Coating is tack-free after a few minutes and can be built up to 40 mils thickness in a single operation.

"Plastispray" is available from Liquid Plastics Corp., Dept. CP, 50-02 23rd St., Long Island City 1, N.Y. When inquiring specify CP 3364 on form opposite last page.

Cane juice clarifying unit has 30% less volume

Physical characteristics, critical dimensions, and operating advantages of high-speed cane juice clarifier are listed in four-page bulletin. Wash and line drawings of typical units are included. Clarifier is designed with 30% less volume than conventional units with equivalent working capacity.

Bul 4092 is issued by Dorr-Oliver Incorporated, Dept. CP, Barry Place, Stamford, Conn. When inquiring specify CP 3365 on form opposite last page.

Describes features, specs for gas detector

Illustrated data sheet describes and shows gas detector in operation. Operating principle and general description are included. Text also explains how detector can be used for checking combustible vapor conditions in any location.

Form G-755 is issued by Johnson-Williams, Inc., Dept. CP, Palo Alto, Calif. When inquiring specify CP 3366 on form which is located opposite last page.

Describes valve actuator with linear movement

Two-color booklet of eight pages describes valve actuator with linearity between instrument air output and stem position. Six typical installations are suggested in diagrams. Booklet includes engineering data on valves and actuators.

"Type CV Control Valves" is issued by Foster Engineering Co., Dept. CP, 835 Lehigh Ave., Union, N. J. When inquiring specify CP 3366A on form opposite last page.



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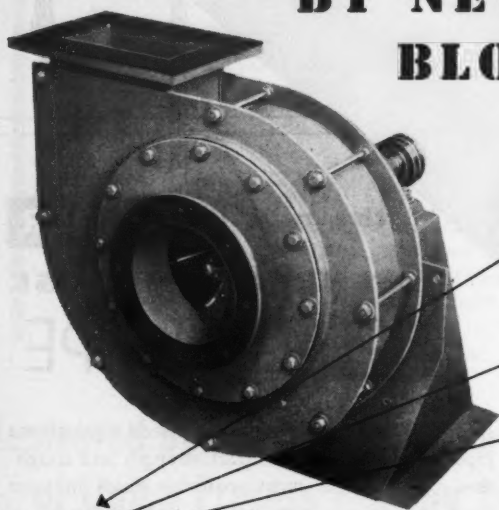
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PROCESSES, EQUIPMENT and MATERIALS



Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here, if you want more data you can write manufacturer direct... or turn to last page and use the "Information Request Slip." This is a special service provided by the publisher... no obligation or charge, of course. The publisher contacts the proper manufacturers for you—information comes to you direct.

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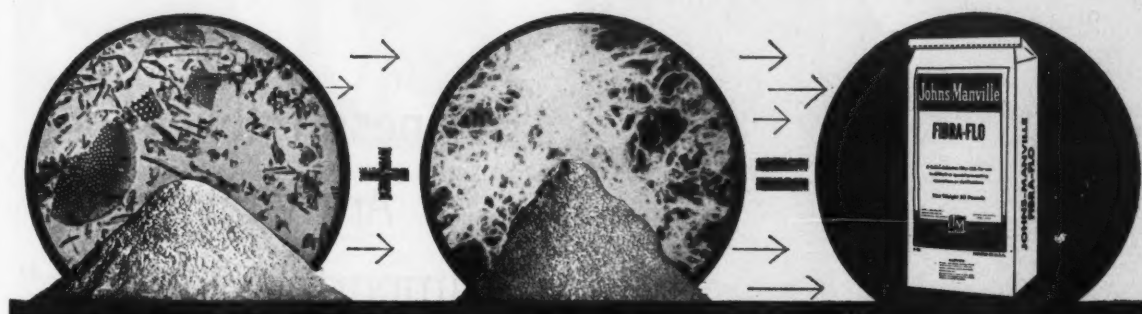
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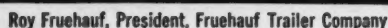
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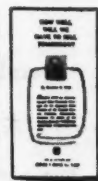
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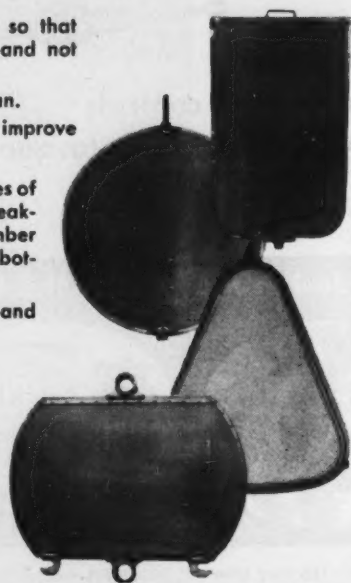
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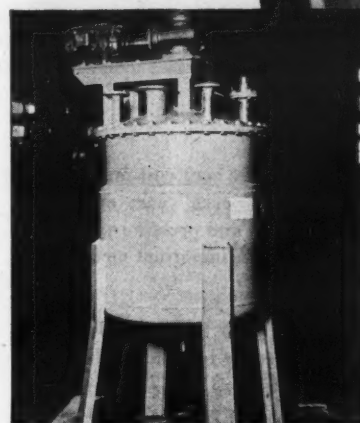
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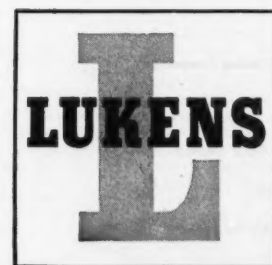
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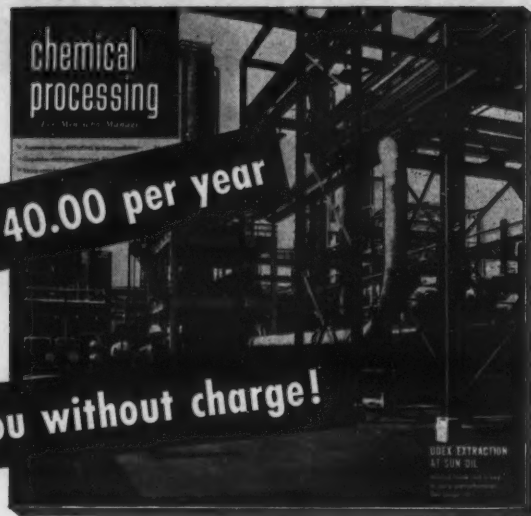
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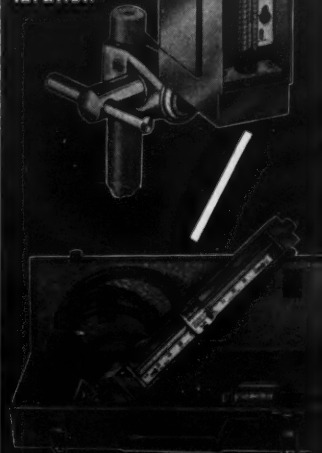
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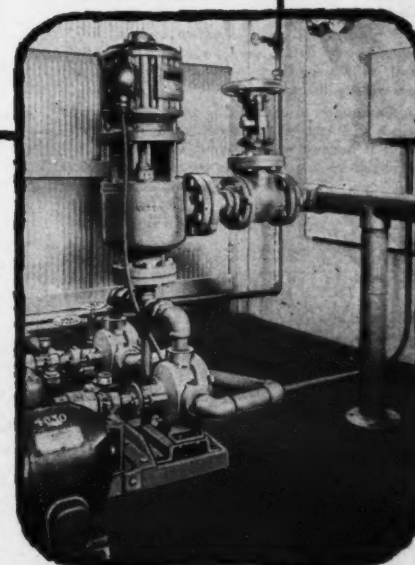
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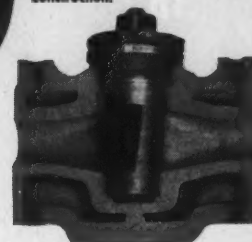
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At left: Jacketed 3-Way Plug Cock.
Below: Cutaway section of Jacketed Cock, showing packing gland construction.



Jacketed Pipe, Pumps, Valves and Fittings...



Jacketed Motor, with set-back register, for measuring viscous liquids.

for maintaining uniform temperatures (hot or cold) in process pipes

Regardless of whether the material is being heated or cooled in the processing, and what heating or cooling medium is being used, H & B jacketed fittings are available for all applications. Steam, hot water or hot oil may be used for heating, cold water or brine for cooling.

H & B can save you money on your jacketed pipe and fitting requirements because we buy all standard size pipe from the mill in carload lots, make our own special flanges in quantities, and are tooled up for making jacketed equipment at lowest possible price. Write for Bulletin J-50.

HETHERINGTON & BERNER INC.
711 KENTUCKY AVE.
INDIANAPOLIS 7, IND.

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OFFER

INSTANT-USE

INSTANT SETTING FLOOR PATCH

Repair broken factory floors without the usual traffic tie-up. Simply shovel INSTANT-USE into hole or rut — tamp smooth — truck over! No waiting! INSTANT-USE bonds tight to old concrete — right up to a feather edge. It's tough. Wears like iron. Won't crack or crumble. install complete overlay where floors are badly chewed up. Used indoors or out. Immediate shipment!

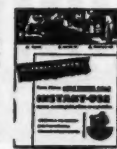
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FLEXROCK COMPANY (Offices in principal cities)
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2913a	Process Refractometer	2960	Lithium Iodide Crystals	3003	Liquid Meter	3053	Manostat	3088c	Pickling Acid Inhibitor
2913b	Infrared, Gas, Oxygen and Ultraviolet Analyzer	2961	Phthalic Anhydride	3004	Hydrogen Analyzer	3054	Electron Microscopes	3088d	Granodine & Granodraw
2914	Pressure Filters	2962a	Catalyst Carriers (state which)	3004A	Infrared Analyzer	3055	Dispersants for Wettable Powders	3089	Canned Pumps
2915	Neoprene Filter Paper (state requirements)	2962b	Refractories	3009	Potentiometer Transmitter	3056a	Water Still	3090	Surface Alloying
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2921A	Plate-scales	2968	Mold Release Compound	3011	Temperature Regulator	3061	Incubators	3094	PVC Pipe
2921	Plastic Duct	2969	Starch Converting	3012	Proportioning System Control Panels	3062	High-purity Chemicals (state use)	3095	Impact Mill
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2924	Crystal Dehydration	2970c	Liquid Chlorine	3015	Industrial Thermometers	3065	Gas Analyzers	3098	Coating Process for Plastics
2925	Teflon Mechanical Seals	2970d	Caustic Soda	3016	Motor Starter	3066	Flame Photometer	3099a	Corrosion-inhibiting Primer
2926	Amorphous Elemental Boron	2970e	Paradichlorobenzene	3017	Flow Meters	3067	Small Batch Mixers	3099b	Corrosion-inhibiting Coating
2927	Rotary Extractor	2970f	Tetrachloro Phthalic Anhydride	3018	Combustion Analyzers	3068a	Myristic Acid	3100	Tank Liner
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2943	Diaphragm Slurry Pumps	2982	Emulsion Paint Vehicles	3033	Leak Detector	3077a	Super Agitators & Mixers	3114	Aluminum Piping
2944	Nitrogen Solution	2983	Acrylic Binder	3034	Liquid-level Gage	3077b	Steel-head Ball Mill	3115	Resins
2944A	Ammoniator-Granulator	2984	Starch Ethers	3035	Liquid-level & Industrial Controls	3077c	Classifier	3116	Tank Weighing System
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2948b	Other Intermediates (state which)	2989a	Antifoam AF	3040	Level Control	3077h	Wilfey Concentration Table	3121	Industrial Gloves
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						3085	Unplasticized PVC Fittings	3132d	Trolleys
						3086	Chemical Resistance of Valves	3132e	Lifts
						3087	Protective Coatings	3132f	Hoist Chain
								3132g	Cranes

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JANUARY 1956

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3133	Tractor Shovels	3177c	Grinders	3222	Contour Retainer Mesh	3279	Quick-seal Couplings	3331	Heat-transfer Fluids
3134	Check Weigher	3177d	Pulverizers	3223	Boilers	3280	Conveyor Dryer	3332	Gear Pump
3135	Crate Clamp	3177e	Separators	3224	Solenoid Valves	3280A	Temperature Regulators	3333	Medical Program
3136	Industrial Motor Grader	3177f	Selectors	3225	Spun Mineral Wool Insulation	3281	Cement Bond	3334	Refractometers
3137	Direct-from-Drum Pump	3177g	Granulators	3226	Spray Dryer	3282	Safety Step Ladder	3335	Corrosion-resistant Valves
3138	Magnetic Separator	3177h	Conveyors	3227	Dust Collector	3283	Vertical Wet Pit Pump	3336	Filter Presses
3139	Stationary Drum Rotator	3178	Drying Equipment	3228	Circulation Heater (state which)	3284	Push Button Enclosures	3337	Petroleum Products
		3179	Waste Gas Heat Exchangers	3229	Needle Valve	3285	Brazing and Soldering flux	3338	Valves
				3230	Drum Tilters	3286	Flexible Metal Hose	3339	Infrared Spectrophotometers
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3140b	Ice-thickness Control	3182a	Dissolvers	3232	Nickel & Nickel Alloys	3288	Electrical Wrapping	3341a	Batch-mixing Calculator (see coupon)
3140c	Non-conductive Liquid	3182b	Mills	3233	Dispersing Mixers	3289	High-pressure Gages	3341b	Pneumatic Agitator
3140d	Standard Time Switch	3183	Air Regulator	3234	Solder	3290	Tube Expander Controller	3342	Stainless Steels
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3140h	Automatic Reset Timer	3187	Pulverizers (state requirements)	3238	Brake Motors	3294	Precipitated Calcium Carbonates	3346	Washing Screens
3140i	Electronic Timer	3188	Tubular Filter	3239a	Drying Mill	3295	Sorbic Acid	3347	Insecticide Formulations
3141	Tubular Conveyor	3189	Solvent-extraction Column	3239b	Flash Dryer	3296	Pumps	3348	Open Blast Burner Nozzles
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3145	Pulsating Panel Bin	3192	Rotary Batch Mixer	3243	Wire Mesh	3300	Electrical Test Equipment	3352	Thermometers
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3147	Test on Titanium	3193A	Control Centers	3245	Visual Control Board	3302	Adjustable-diameter Sheaves	3354	Proportioners
3148	Liquid-liquid Extraction	3194	Nitrogen Generators	3246	Pipe Joint Compound	3303	Motor Control	3355	Pressure Vessel and Process Equipment Fabrication
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		3195b	Transmissions	3248	Friction Power Take-off	3305	Control Valves	3357	Process Heating Equipment
3150	Automatic Tank Gage	3196	Filter	3249	Direct-fired Air Heater	3306	Refractory Materials	3358	Water Treatment Instruments
3151	Dryers	3197	Change-can Mixer	3250	Corrosion-proof Flooring	3307	Tank Data	3359	Improved Polyethylene
3152	Pipeline Trap	3198	Disintegrators	3251	Flexiglas Panels	3308	Direct-flow Pump		
3153	Solenoid Starter	3199a	Pumps	3252	Process Heaters	3309	Fatty Organic Chemicals	3360	Blowers
3154	Ultrasonic Cleaning System	3199b	Pipe and Fittings	3253	Blasting Grit			3361	Pumps
3155	Sound Detector	3199c	Heat Exchangers	3254	Air Purification with Activated Charcoal	3310	Radiator Valves, Steam Traps, Air Vents	3362	Borescopes
3156	Safety Clothing	3199d	Cascade Coolers	3255	Adjustable-speed Drive	3311	Transistors	3363	Dial Thermometers
3157a	Perfume (state product)	3199e	HCl Absorbers	3256	Automatic Pressure Regulators	3312	Mold Lubricants	3364	Protective Coatings
3157b	Odor Neutralizer (state product)	3200	Fittings and Flanges	3257	Nickel Cast Iron Valve	3313a	Copper Fabrications	3365	Cane Juice Clarifier
3158	Acid Bottle Carriers	3201	Filter Aid	3258	Water-driven Tube Cleaner	3313b	"Life Extension for Condenser Tubes"	3366	Combustion Alarm
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		3203	Tube Sealer			3314b	Horizontal Rotary Vacuum Filter	3367	Plastic Pipe
3160	Self-priming Centrifugal Pump	3204a	Pilot Plant Homogenizer	3260	Reflux Heads & Redistributors	3315	Film Badge	3368	Plastic Exhaust Blower
3161	Chemical Pump	3204b	Colloid Mill	3261	Solenoid Valves	3316	V-belt Drives	3369a	Electric Heater
3162	Ozone Recorder	3205	Wire Cloth and Fabrication	3262	Heat Exchanger	3317	Boilers	3369b	"101 Ways to Apply Electric Heat"
3163	Plastic Graduates	3206	Portable Paint Filler	3263	Fastenings	3318	Heat-resistant Coating		
3164a	Rubber-lined Fire Hose	3207	Stainless and Monel Utensils	3264a	Seamless & Welded Tubes	3319	Screening Catalog	3370	Asbestos-diatomite Filter Aids
3164b	Abrasion & Chemical Resistant Fire Hose	3208a	Sheet Filters	3264b	Seamless Fittings & Flanges			3371	Air-driven Tube Expander
3165a	Loading Arms	3208b	Asbestos Filter Sheets	3265	Bag Packer	3320	Vibrators	3372	Filter Leaves
3165b	Swivel Joints	3209	Plastic Containers	3266	Pipe and Tubing Cleaner	3321	Organic Chemicals	3373	Filters, Mixers, Tanks
3166	Gas Detector			3267	Calcium Silicate Insulation	3322	Pneumatic Regulator	3374	Corrosion-resistant Pumps
3167	Safety Cans & Equipment	3210	Portable Bag Closer	3268	Control Valve	3323	Seamless Welding Fittings	3375	Clad Steel Equipment
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3169	Gages	3212	Weigh Feeder	3270	Valve Selection Chart	3324b	Fly Ash Collector	3377	Filter Paper
3170	Automatic Autoclave	3213	Valve Bag Packer	3271	Pressure Vessel Cover Lock	3324c	Cyclones	3378	Rotary Pump
3171	Filtration Systems	3214	Packaging Machine	3272	Gaskets, Shims, Washers	3325	Tubular Filter	3379	Teflon Packing
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3173	Packaged Ammonia Converter	3217	Imperious Graphite Heat Exchanger (state type)	3275	Inspection Light	3328	Silicone Rubber	3381	Concrete Floor Patch
3174	High-velocity Burners	3218	Welded Tubing	3276	Corrosion-resistant Pipe	3329	Piston Packing	3382	Impulse Steam Trap
3175	Freeze-drying Unit	3219	Tantalum	3277	Dust Control System			3383	Gas Fork Lift Truck
3176	FluoSolids Systems for Coal Drying	3220	Chemical Cleaning						
3177a	Dry-batch Blenders								

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 111 East Delaware Plaza, Chicago 11, Illinois

**THAT'S
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(Continued from page 2)

**"Ears" the latest in
submarine detection**

A plastic float weighing 42 pounds but supporting 20 times its own weight is being tested as a means to support heavy and complex sonar equipment—used as "ears" to detect submarines—dropped from aircraft into the water and then recovered after the instruments have



"They went that-a-way"

served their purpose. Float material is a foamable polystyrene that is tough, lightweight, has exceptional buoyancy, and can be molded to any desirable shape.

In use, sphere floats on top of the water with sensitive measuring and detection instruments suspended underwater beneath it. Instruments transmit sound waves that are reflected by any solid objects in the area. Reflected waves that return to receiver are recorded and measured—information that is transmitted by radio to nearby vessels or aircraft.

Talking toys with voices

Voices that really talk are being given to toys. The secret is a tiny rigid vinyl plastic record placed inside the toy. Turning a crank protruding from the toy produces a nursery rhyme, song or other recorded message. Up to 25 seconds of sound are given, with a reset mechanism for repeating.

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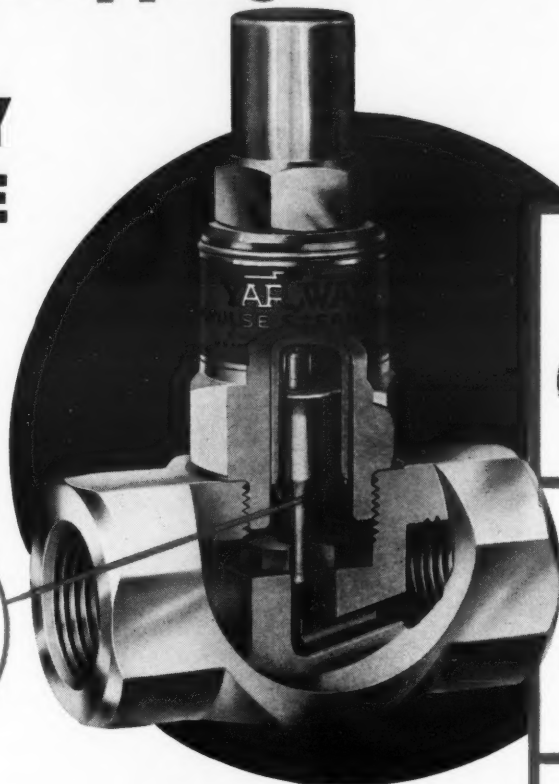
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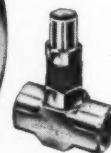
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